INDUSTRIAL ARTS and VOCATIONAL EDUCATION

April, 1940
Vol. 29, No. 4

PUBLISHED MONTHLY, EXCEPT DURING JULY AND AUGUST, BY THE BRUCE PUBLISHING COMPANY, 540 NORTH MILWAUKEE STREET, MILWAUKEE, WISCONSIN

Eastern Office: W. 42nd St., New York, N. Y. — Western Office: 66 E. South Water St., Chicago, Ill.
Pacific Office: 580 Market St., San Francisco, Calif.

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IN THIS ISSUE

The reader's attention is called to the spread of general articles in this issue. There are eight of these articles which may well be read by every teacher of industrial arts and vocational education.

Then there are 4 articles specially for the teacher of electricity, 2 for the printing instructor, 2 for the mechanical-drawing room, 4 for the metalworking shop, 2 for the teacher of machine-shop practice, 10 for the woodworker, and 2 for the auto-mechanics shop. Several of the problems and projects section can well be adapted to the needs of the general shop.

ASSOCIATION NEWS

In the Association News column on page 23A, the reader will find announcements and reports of the meetings of city, state, and national associations interested in industrial arts and vocational education.

We are glad to publish news of this kind if it is sent to us. The closing date is the 5th of the month.

THIS MONTH'S COVER

The picture chosen for this month's cover depicts a commercial application of the use of coated abrasives.

The craftsman shown in the picture is disk sanding the hull of a 55-ft. Chris-Craft motor yacht preparatory to the application of the first coat of paint.

Photograph courtesy of Chris-Craft Corporation and of Behr-Manning Corporation.

Articles Indexed — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."
Entered Jan. 2, 1914, as second-class mail matter at Milwaukee, Wis., under Act of March 3, 1879. Copyright 1940, by the Bruce Publishing Co. Title registered as Trade Mark in U. S. Patent Office, Nov. 25, 1930. Published monthly except during July and August.
Subscription Information — Subscription price, $2.50 per year, payable in advance. Canadian postage, 25 cents, foreign countries, 50 cents. Copies not over three months old, 35 cents; more than three months, 50 cents. Notice for discontinuance of subscriptions must reach Publication Office in Milwaukee, at least fifteen days before date of expiration. Changes of address should invariably include old as well as new address. Complaint of nonreceipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.
Editorial Contributions — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.
The Magazine is on sale at Brentano's, New York; Wanamaker's, Philadelphia; Brentano's, Chicago; Philippine Education Co., Manila, P. I.

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W-16
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Short Talks on Wood

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This is the sixteenth of a series of brief articles dealing with various woods, their properties and uses. It is our hope that they might make interesting and helpful classroom material. We will welcome your suggestions as to the species of wood you would like featured in this series.

YATES-AMERICAN

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

April, 1940
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The Industrial-Arts Curriculum in a New Social Order

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An analytical discussion of how industrial arts and vocational education can be correlated with other branches of the curriculum to prepare boys and girls for their life's work.

The age in which we live is marked by rapid change, great engineering progress, disturbing social upheavals, far-reaching economic distress, world-threatening wars, and widespread distrust, hatred, and despair. Civilization, greatly advanced materially but socially and morally at low ebb, has conquered the secrets of both nature and science sufficiently to know how to produce every necessary item of material comfort in great abundance, but has not yet learned how to establish a satisfactory social order that can provide the abundant life for everyone. The great problem of this age is that of getting men and women to accept their full social obligations to their fellow men, and of influencing them to cooperate effectively with one another to the end that the spiritual, social, material, physical, civic, vocational, and avocational needs of all people may be properly met. Unquestionably a great task has been set all right-thinking people by the disturbing and chaotic conditions of these times. Leaders are needed who can direct the thinking of people to a humane and just consideration of these great human needs and in addition mobilize the efforts of mankind so that a more just and stable social order may be established.

Education must play a great and major part in this effort, and educators, whether in administrative offices, classrooms, school shops, or laboratories, must take a realistic view of present conditions and discharge their responsibilities intelligently, courageously, and energetically in light of these realities. Upon them depends in large measure the success of new movements designed to foster human happiness and social progress.

A careful appraisal of the present serious world and domestic crises points definitely to the need of clear analytical thinking, sound planning, and adequate social action. It is obvious that these perplexing problems can only be solved as intelligence is brought to bear upon them by enlightened leaders who have the support of intelligent people. In America we think of the school as the great democratic agency that brings to the people the necessary understandings, appreciations, attitudes, and skills which strengthen and fortify them in dealing with the pressing social problems of the day. Consequently, this agency cannot be a static institution. It must in the very nature of things be dynamic, virile, and flexible, to keep pace with the changing conditions that an evolving but imperfect social order creates.

Constant Revision Required

If the school as a social institution is to be kept dynamic, virile, and flexible, it will need to be continuously checked, modified, and improved. The school in some respects is not different from an economic enterprise, such as the railroads for instance. Railroads to meet changing conditions are also being overhauled, reconditioned, and improved. Streamlining education is as much in order today as streamlining transcontinental trains. The ox-cart type of education is as outmoded as the first Baltimore and Ohio engine. Neither has a place in American life today and each has had to give way to something better.

The same pressures which demand fast, safe, and comfortable travel on the American railways, demand of the American school an educational service which fits the life of the times and renders the services the people both want and expect. The American school can no more pursue its course in sheltered isolation, out of touch with the realities of life, than the railroads can now succeed with the "public-be-dammed" policy that once characterized their attitude toward the public before air, bus, and truck services threatened their monopoly. Those who administer our schools, like those who manage our railroads, must clearly understand all the needs for which effective services must be provided. Consequently, there is nowhere any justification for maintaining anemic, ineffectual schools that fail to keep progressive pace with the needs that arise out of present conditions.

Since the present social order is a very imperfect one, there is much for the educators in charge of the schools to think about and do. The call for intelligent, courageous action is certainly very insistent in these stirring times when democratic civilization feels its very existence and safety to be threatened. Obviously the challenge to American educators is unmistakably clear and the opportunity for fine public service correspondingly great.

If, as a consequence of our study of the critical situation in which our American society finds itself, we accept the thesis that the schools must make their contribution to meeting a great range of pressing needs, we, who have some responsibility for administering practical education in American schools, may well ask what are the implications for us. We may ask further what, in view of the present difficult economic and social situation that exists, is the place of practical curriculums in the offerings of these revitalized schools which are to be streamlined to the current demands of this turbulent period in American history? We may inquire further and determine what new conditions, if any, we have disregarded to which we should be giving consideration. And finally, we may want to determine what new plan of attack we should follow to discharge properly our obligation to the public we serve.

Before we look forward we may perhaps get a new sense of direction by looking back to the origin of the practical curriculum in the American school. We should note that the practical curriculum got its place in the schools, and particularly in our secondary schools, as a result of social pressure. As education became more common throughout our country in response to the demand that every boy and girl should be well educated, it was natural that its selective character should change. The increase

of numbers, especially after the world war, when interest in education was greatly accelerated, crowded the American schools with an unselected population of school children. With this great influx of American boys and girls both before and after the war, the problems of teachers greatly increased. The traditional literary curriculums were unacceptable to a large part of the school population. Notwithstanding all the heroic disciplinary attempts teachers made to compel students to accept the literary curriculum, it became necessary to expand it. With this expansion there came, early in some places and later in others, such subjects as manual training, home economics, commercial subjects, art, music, and certain other academic subjects as well. Still later similar pressure brought vocational offerings to the schools. But the school teachers did not lead in this movement. They were forced to accept it in spite of their resistances. They were conservatives who stood for the *status quo* of their day, not leaders who moved forward to something better.

Introducing Practical Subjects

Now it is a curious fact that those who were put in charge of the new subjects — new subjects that were placed in the curriculum largely to satisfy the demands of a large body of people who wanted to see some relationship between part of what they pursued in school with what they expected to do later in their life careers — fell into the same error that the academic teachers before them had fallen into. They became subject-matter teachers who worked in compartmentalized areas which they administered in a manner unrelated to the activities of their colleagues. And they became as self-centered, as provincial, and as myopic as their academic associates had become. Each fought for a place in the time schedule for his subject, for favorable rating under accreditment plans, and wanted his subject to be counted as part of the 15 or more units that are required for a high-school diploma. And in the management of these new subjects there was much of standardization and regimentation that came out of the fixed courses of study which were often very rigidly applied. That was in a day when pupils were fitted to the curriculum (a practice not wholly missing in American school practice today) instead of fitting the curriculum to the needs of pupils.

A retrospective glance must convince us of the fact that though practical curriculums secured a place in our schools under social pressure, over the protests of the teachers of the traditional literary curriculums, the pioneers in our field copied much of the bad practice of those who opposed their entrance into the schools. That is to be explained in part by the minor place they held in the schools at that time and their lack of numbers. The pattern of their work was largely determined for them by those who controlled the schools. Theirs was a very feeble voice in the beginning, a voice that grew stronger as recognition of the new work became more general with the passing of time. Fortunately, we have arrived at a day when sound programs offered by the practical educators receive a fuller and more decent consideration in the determination of public school policy than was formerly the case.

This is true because educators generally have adopted more scientific methods in the study of their problems and have acquired something of an administrative readiness which makes adjustment to new conditions less difficult. This readiness, too, has been greatly accelerated by the social and economic shocks that have jarred the structure of all American life. It was natural, notwithstanding the growing spirit of professional alertness and awareness on the part of many schoolmen, that these great social and economic pressures should greatly affect their work and speed their activities. And with it all it was to be expected that people generally in the midst of new difficulties would want to reappraise this great institution, the school, in which heretofore they had reposed great but blind faith.

The old enthusiasm for education for everybody still persists, but it is no longer a trusting kind of enthusiasm. It has been displaced by an analytical and critical support which questions everything and seeks to learn whether or not those in charge of America's schools are discharging their duties fully cognizant of their responsibilities. It is a kind of support which insists that the schools must return great social good for the economic support provided them. The American school administrator in this present day can no more complacently administer schools, indifferent to changing conditions that bring new educational implications with them, than the railroad executive who seeks to take his railroad out of bankruptcy to achieve financial solvency can be indifferent to the social forces that affect his situation. Consequently, we in education must not only examine the world in which we operate but must also re-examine our objectives, our offerings, and our methods, to ascertain whether we are administering our schools on a sound basis. In short, we must not be blind to the new social pressures that call for further adjustments today.

Such an objective examination of the situation in which we find ourselves brings to light several important facts bearing upon changed conditions to which we must not be indifferent. We should note:

The Conditions Today

1. That we operate schools in an industrial world that has for more than a decade been unable to employ all our *unused* human resources. Once every able-bodied American who wanted work had plenty of work to do. Today youth over 18 and under 25 years of age in large, medium-sized, and small American cities is idle to the extent of 30 to 40 per cent of the youth population resident in them.

2. That old people outnumber young people. The ratio of adults to children is about as 1 is to 1. In the first national census the ratio was 2 to 1 in favor of children. We are living in an older people's world controlled by older people.

3. That the economic argument in favor of education, so prevalent twenty to twenty-five years ago when every day in school had a dollar value specifically stated in the educational literature of the times, is no longer valid. So far as economic advantages are concerned, the high-school graduate of today is no better off generally than the common school graduate was a quarter of a century ago. Universal education has greatly raised the general preparation of the people. With increasing unemployment caused by new conditions in our changing situation, this higher education proved to be no insurance against economic insecurity. The very enactment of the federal wage-hour law indicates that legal controls had to be instituted to limit the damage that would be done to the general economic status of many people were no such protection afforded. Universal education has educated many people who, though they have gained culturally, find themselves vocationally in occupations for which a much lesser education will do. There are literally thousands of people in our land today for whom the old "education pays" slogan has become an exploded myth.

4. That the young people today must expect by and large to enter full-time employment later than was true for preceding generations. They must expect to spend more time in school or else in idleness before they can hope to secure steady employment. This is definitely an outgrowth of the general lack of employment opportunity that is so prevalent now.

5. That young people have no opportunity to pioneer on new land. The public domain is now exhausted and the amount of homesteading and prospecting open to our people is so negligible that it affords no real opportunity to large numbers of people. Reflexively this is forcing new charges upon the adult population which must support youths longer than they formerly were supported. These new charges must be paid from family income and public taxes. Our society must now make an increased contribution to the support of young people that formerly was paid directly out of natural resources.

6. That the nature of occupations is changing sufficiently to disturb the proportion of unskilled, semiskilled, and skilled workers to the total of which they are part. The advent of laborsaving machinery is reducing the ranks of the unskilled. The number of semiskilled is increasing only slightly. There is a marked increase in the number of clerical and professional workers. The shift greatly affects the provision that must be made for occupational training. In the aggregate there is need for more occupational training than was formerly true.

7. That modern industrial practices tend

to promote quantity production and specializations which provide creative-work opportunity for a minority of workers and monotonous and routinized work for the great mass. This dual situation definitely affects American school policy.

8. That the outlet for creative skill for many thousands of workers can only be provided through avocational opportunities which their own or community resources can provide in the form of home or community workshops where their creative skills can find expression. This is a direct outcome of the standardization of American industrial practice to which reference has just been made.

9. That research laboratories are creating new materials which, when produced in volume, in some instances replace other materials that were formerly generally very widely used, thereby affecting some workers unfavorably, and in other instances creating new uses which provide new work opportunity for other workers. Some of these materials, especially those employed in industrial cutting tools, greatly increase the volume of work a single worker can produce. Other materials that have been developed have added artistic values to the product in which they are used. These developments in the field of new materials have, as a consequence, affected some occupations adversely and others very favorably.

10. That the modern home has changed remarkably with the progress of American industry. Thousands of inventions have greatly changed its appointments, its equipment, its appliances, its furniture, and the materials of its construction. The owner of a modern home who wishes to operate intelligently all the installations that contribute to his comfort must possess an understanding of many scientific principles which workers in productive industry must also understand. Thus as a consumer of industrial product the home owner is employing a body of common denominators of scientific knowledge which the worker in industry also employs.

11. That economic depression has interrupted the orderly training of apprentices, with the result that the supply of competently skilled workers has been greatly reduced and created a potentially serious situation for industry that will be felt should recovery come and be sustained for any extended period of time.

12. That the social implications of industrial warfare are such that entrance into industry calls for an understanding of the social conditions of employment as well as vocational understanding of the job.

The foregoing are but a dozen of the compelling social facts which school administrators cannot ignore in their work. Now how does this affect the industrial-arts teacher? The tendency to compartmentalize and to think in terms of limited areas is very strong with all educators. It is something to be guarded against. One needs but look at convention programs to see that education has become, like the honeycomb, a great complex of little divisions. Yet when one looks at John and Mary as human beings whose education has been charged in part to the school, it becomes apparent that they are individuals in whom there is no visible evidence of all their teacher's subdivided efforts. Being individuals, they must function in life as integrated personalities, notwithstanding the fact that a whole succession of specialists may have taught them. It is just that fact that makes necessary a new attack upon this problem of practical education, an attack that is fortunately receiving consideration in many places, one evidence thereof being the excellent manual on "Instructional Aids in the Industrial Arts," which was released in January, 1939, by the practical arts teachers of Indiana. The fact that John and Mary must function as individual personalities in a great variety of situations when their teachers can no longer be with them points clearly to the obligation to begin the organization of their educational work, not with the field in which the particular little portion taught by one teacher may lie, but with the individual for whose benefit the work is offered, and the environment in which this individual must live.

Fitting the Curriculum to the Student

Now if this be done, the work must be approached from an entirely different starting point. The English teacher cannot be told, you build a course of study in Chaucer; the mathematics teacher, you build a course in algebra; the science teacher, a course in light; the home-economics teacher, a course in nutrition; the vocational teacher, a course in bricklaying; the industrial-arts teacher, a course in art metal; and so down the whole gamut of teachers who so often pursue their several specialties without much regard for each other. Instead the work must begin with the individuals who are to be guided, taught, and placed into this complex, changing world. Education must find out what the probable life experiences of these children are likely to be, what adjustments they will have to make in fitting themselves for the world they are preparing for, what limitations they must recognize, what capacities they can capitalize, what safeguards they must have to ward off the catastrophes of life that come so unexpectedly to thousands in these times, and many other things of functional importance in their lives. If these sets of factors are taken into account, reference points are established with which to plot a course of action in behalf of America's children and growing young people.

Under that plan teachers will be brought together in a group — English, mathematics, science, home-economics, vocational, industrial-arts, and all the other teachers with the directions to study both the world in which people live, and the people themselves; and to build their courses in the light of what they have learned about both the individual and his environment. It must be remembered that the part the individual teacher has to offer and which the people need to acquire, must be woven together with the offerings of all of the other teachers. All of the teachers together must weave a strong, durable, and beautiful educational fabric of rich color and pleasing design out of which they will later cut and tailor to proper size and form educational garments suited to the particular measure of individuals who come to them for guidance, instruction, placement, and follow-up until their adjustment is satisfactorily effected.

Naturally this presupposes that someone will at a central point take charge of the curriculum situation. With his educational colleagues he will make an analysis of the type here suggested. Depending upon the size of the unit he controls — state, county, or local — his work will be more or less complex. Administratively, in both the larger and the smaller units, community studies will need to be made through appropriate surveys that will reveal the peculiar facts of the environment for children, youths, and adults in the area under study. These facts when cast up will indicate the community opportunities and limitations with which the school will have to deal. Similarly the school will have to study the people within its jurisdiction and thus secure another set of facts that will guide it further in setting up curriculums suited to the needs of the people residing within that jurisdiction, recognizing, of course, that there will be a considerable body of common denominators which all educable people everywhere must learn to control as they become educated.

Building the New Curriculum

Once these basic facts are determined for the jurisdiction in question, the winding of the various curriculum spools may be undertaken. When they have been wound, teachers must draw threads from them to produce the fabric out of which they will make educational garments suited to the needs of young America. But the schools in which these teachers work must supply the looms on which the weaving may be successfully accomplished, and also the cutting and sewing tools with which the constructive work can be achieved.

Now the weaving of the cloth represents the early general experience of children in which all more or less follow closely a pattern of common denominators important to all alike — the basic stock of education which gives each pupil the cloth out of which to make garments suited to his particular individual needs. This cloth, it must be remembered, is made out of threads drawn from the facts pertaining to people and their activities and the environment in which they live.

It is important to know that in the process of educational weaving the warp threads are the subject-matter divisions teachers so greatly worship, and the woof threads are the body-giving fillers which

bind the warp threads together and which make it possible to produce durable and serviceable fabric. It is also important to know that equipped with looms having the necessary beams, heddles, shuttles, and other important parts required for weaving, any weaver can produce rich and colorful designs provided he has the necessary materials, the imaginative art, and the manipulative skill with which to achieve his task. So too with the educational weaver. As he weaves the woof threads in and out around the subject-matter warp and ties his developing fabric together, he can, in his day-by-day, month-by-month, and year-by-year effort, weave from the simple to the complex at each level of the pupil's experience until the sum total is a usable, integrated, and beautiful whole. How significantly different that is from just winding threads on separate spools to be stuck away in a thread box with sixteen little compartments which are often mislabeled a high-school education, but which are readily accepted by many college professors who in turn keep thousands of young people winding more spools with longer threads, until one by one a large portion of these thousands of students, tired of their prolonged labors, drop out of school to take a fling at real life.

Why not recognize the fact that these thousands must come into their own and are as much entitled to a functional preparation for the life that will be theirs as are the few to whom will be given the opportunity, resources, and the physical and mental strength to carry on to the heights? —And by what right may one suppose that a functional, integrated program of preparation for life for the many, will not also give an equally satisfactory base of operations for the selected few who can work through long years until their intensive studies in graduate schools are completed? Scientific evidence seems to point out that the old suppositions are not valid and that the new proposals are very much in point.

Assuming then, that the foregoing is based on safe premises, what about John and Mary, who, in all probability, will attend school not much more than two years beyond the standard high school. Assume that they will be average folks who will do the usual things that common folks everywhere must and will like or dislike to do. It must be clear that the usual college-entrance type of education will have little significance for them, and that in its place, a type of education must be offered that can arouse their interest, stimulate their effort, and fit them into their world as wholesome, self-sustaining citizens.

In that world John and Mary will have unnumbered thousands of experiences. They will have to understand their world, find work to do in it to earn a living, get along and cooperate with others on many levels, consume goods and services, establish a home, keep physically fit, assume parental obligations, manage resources as they acquire them, use their leisure time advantageously, recreationally, socially, and intellectually, participate in government, cope with untoward circumstances and conditions, and live a day-by-day life with all that changing conditions will force upon them, the best they know how, with the abilities and limitations they possess.

Analyzing Pupil Needs

Preparation for this will make use of all the offerings interested schools, homes, and communities can provide. Preparation for such a life does not consist of a single warp thread — practical, academic, or otherwise. It consists of quite a number of such threads, all of which must be bound together properly. As one analyzes the needs of John and Mary, it is easy to see that they fall into three large categories. There are the things that John and Mary must be. Then there are the things they must know, with which they can think and plan and invent, and finally there are the things they must do. And if one thinks about this for a moment one can see that each warp thread in the fabric, still listed in most school curriculums under subject-matter headings, can be handled in such a manner that pupil experiences will influence positively and favorably what John and Mary are to be, what they will know, and what they will be able to do.

This is true also of the industrial-arts and vocational warp threads. There are many such threads in both of these areas in the field of education today. Like the teachers in other fields, shop teachers can wind the threads on spools or weave them into fabric. The old system of jointmaking in school shops is a sample of spool winding. Learning simple, repetitive nut-tightening operations on an industrial assembly line is another example of the same thing drawn from industry. Numerous occupational assignments are of that character for many workers today, but many others are challenging because they require the exercise of a variety of abilities and skills. For some workers, experiences of both kinds may be assumed.

In this connection, it may be well to follow John for a moment. Suppose that he will ultimately work on an assembly line at fair wages but also that he will later lose this job. He may then need to adjust to a little piece of land, or attempt to work at some other job elsewhere in some shop or industry which will call for creative abilities and manipulative skills not required of him on the assembly line. In view of all these varied possibilities teachers must do their best to fit him for any contingency. They must assume that he is destined for the most exacting creative type of work and yet realize that he may really move about frequently from one ordinary job to another, and that in fact he may even experience unemployment itself. Under the circumstances, whatever his destiny may be, it is the teacher's obligation to protect him so that he can utilize his abilities to the best advantage in dealing with such opportunities as may come to him.

Taking this into account, one finds educational objectives to be very far reaching and extending over a wide range of conditions. All this must be built into his educational work. Consequently as the teacher builds vertically with the warp and horizontally with the woof, he must order a series of experiences from the primary levels to the very end of the secondary period — the new secondary period which must now be recognized to be two years beyond the standard traditional high school — calculated to help John make his adjustment.

This must be available to him on home ground, or at least at a point not too distant from him in what may be regarded the home area. The schools through which he will pass should be able in proper sequence and balance to offer him the functional curriculum he should have, and, with respect to practical activities, make it possible for him to pursue a practical curriculum carefully graded throughout the whole range of his school experience. It should begin with the simple construction work in the kindergarten and primary grades, expand to more serious practical work of an orientation type in the higher grades and junior high school, followed by some exploratory opportunities in the senior high school, and with preoccupational training in the junior college, to be capped finally by extended specialized occupational training on the job in the community in some appropriate apprenticeship relationship or equivalent.

At each level in this progressive sequence, balance will be achieved by tying most of the other school activities into the practical or manipulative work. John must learn to talk and later to write about his work as well as to do it. He must acquire many special vocabularies as well as the general vocabulary which he employs as a vehicle of expression. The teacher in the English classroom can correlate some of her work with that of the industrial-arts teachers so that high motivation will result in both the English and the industrial-arts work. Certainly the industrial-arts teacher through interdepartmental cooperation can stimulate interest in his work to a very high degree with beneficial results to John. Also, he can early direct John to pertinent literature in the form of books, magazines, and newspapers to add romance to the shop or construction work John will attempt under his guidance. Thus as John gains manipulative skills and learns to work with tools, equipment, and materials, learning to master this operation and that, and utilizing them all in doing constructive work, he can broaden out his background of understanding about many jobs which will help him to relate the work of the school shop or laboratory to the great world outside where men and women are doing useful work under modern industrial conditions.

But the industrial-arts teacher cannot stop there. All through the twelve to fourteen years of John's school life, as one woof thread after another is shuttled

through the warp, the story of man's work must unfold. A clear picture should result for John, of man's beginnings under primitive conditions when man fought with Nature for every inch of progress he made. With the passing of time the story should be carried forward until John understands the fine divisions of human labor in which man engages in this complex industrial life of today. Here it is the duty of the industrial-arts and later the vocational teacher to correlate the work of the practical courses with the work of the social-science teacher. Both should work together so that between them the occupational life not only of the immediate community but of the nation and the world are well understood. Both types of teachers will utilize their museum resources, films, slides, pictures, prints, and field trips to effect this orientation of the occupational world.

In the development of practical opportunities in the long school sequence, typical common fields will be surveyed and explored so that all-round mechanical ability with hand tools and simple machines and auxiliary equipment may be acquired. These should be arranged as much with consumer objectives as with ultimate vocational and immediate general objectives in mind. Therefore there will be much correlation with both science and mathematics. Principles of physics, chemistry, biology, and other sciences will be incorporated into the practical curriculum. Communication, transportation, refrigeration, ventilation, heating, mechanical and electrical appliances found in the home, will all come under scrutiny. The work of the science teachers will be basic to all this, but the industrial-arts teachers will furnish many practical applications where John can observe, study, and work with opportunity to apply the knowledge he is acquiring. And here again the shuttle passes back and forth many times bringing new increments of understanding, appreciations, and attitudes as he acquires skills under the guidance of his teachers.

The same is true in the field of art, drawing, and design. What rich possibilities here! In this case the industrial-arts teacher must again tap the rich resources an associate has to offer John. If at this point good correlative work is done, John will learn how to beautify his home or his room, and learn to appreciate line, form, color, harmony, and balance in the world about him. The art and drawing teacher and the industrial-arts teacher as a team have a splendid opportunity to stimulate a critical appreciation of beauty as it may be applied to utilitarian things. They will also be able to develop John's ability to draw and design and to interpret the drawings of others. How many points there are where drawing and sketching play an important part, not only in the schoolroom in the work to be done there but later in life also. No one who is educable should grow up unable to interpret prints and simple drawings that are representative of the constructions the modern world uses, nor fail to develop some creative skill with pen, pencil, and brush.

But there are other teachers who have something to contribute. Thus the teacher of mathematics should not be slighted. All the way up and across at each level, again and again, there is opportunity to apply numbers, in simple and more complex combinations. Mathematics plays a large part in practical work, especially when the vocational levels are reached. But note how well it also ties into the work of the art, science, and social-science teachers in the way of geometric constructions, formulas, and statistical devices. The teacher misses a great opportunity if he ignores this colleague. He too must be in the family of educators to help shuttle woof threads through the educational warp.

Then all along as John goes up the vertical scale acquiring skills and knowledge and developing his abilities, all his teachers should be furnishing him a guidance service that will help him to understand clearly his limitations as well as his possibilities and so help direct his interests to some more pointed purpose where he can undertake some particular specialization that may lead to self-support. This may or may not require some preliminary exploration. That will depend on what John has become and how he thinks. He should if possible be given some opportunity to test himself, and if he can come to some such purpose early enough and the school can offer him specialized preoccupation training on the upper levels of the high school or junior college, this should be afforded him. Not every community is able to provide this service, and so will find it necessary to depend upon tryout experience in the field.

But even on the vocational levels which top the industrial-arts school career in communities that can supply the educational services to this point, the school work must not be reduced to mere specialized skills. The junior-college progam may very well be so arranged that 50 per cent of it will be given directly to practical prevocational or vocational training and the other half to cultural and related offerings with emphasis upon college-survey courses that broaden John's vision still further and bring the active world still more realistically to him.

Following this comes the period of placement. The school has a responsibility here, especially in the populous centers where employment difficulties exist. The school, aided by state employment services, can and should be a factor in bringing the right job to John and putting John in a job where he will fit. It should not let go of him until assured that a real adjustment has been made in a place where he can function confidently, safely, and efficiently, and make a service contribution to society.

For quite some time Mary has not been mentioned in this discussion. While her program will at points be differentiated and her practical interests lie in other fields, she will, if she is job-minded, follow much the same kind of procedure in her preparation for an occupation. But even so, there should be overlapping at many points in the practical curriculum for both John and Mary. This should be so because when John and Mary establish a home there is much they will need to know in common. Consumer education will have great value for both of them. Such education can be provided through the fundamental industrial-arts training that can be made available to each before occupational training is actually begun. The effectiveness of this work in both the general and specialized areas will be greatly enhanced through proper integration with the other school subjects which will all become more meaningful and useful as they are developed together in the closely correlated manner just described.

Pull-up chair and humidor. Harry L. Barta, Bay View High School, Milwaukee, Wis.

Creative Practical Arts and Vocational Education

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Common observation indicates that man rises to his greatest height when he works creatively. The world's outstanding fine and industrial art is evidence that the most enduring work is done by those who work in the spirit of the artist craftsman. It was such an attitude that gave to the world the art of Rembrandt, Titian, Corot, Millet, and Sargent. It was such a compelling force that resulted in the Parthenon, the Taj Mahal, the Cathedral of St. Peter in Rome, and the exquisite Heinz Memorial Chapel, the Stephen Foster Memorial and the Cathedral of Learning in Pittsburgh. It was the same powerful drive that brought forth the outstanding works of art in clay, textiles, bronze, glass, wood, steel, and other materials. It is not too much to say that the same creative spirit gave us our system of free public schools and many superior private schools.

What the Parthenon was to the craftsman of Greece, what the Pantheon was to the "glory that was Rome," what St. Peter's was to Michelangelo, that is what teaching is to us — *creative expression*. We teach because we love to teach. To teach is to work creatively with the finest and most precious material that God has made available to us. Creative work enriches, deepens, and sweetens life.

Creative Teaching Must Be Progressive

When teaching is creative it is progressive. A progressive teacher is one who is not satisfied with present accomplishments. He, like a Columbus or a Pasteur, is striving toward goals not yet reached, and toward standards not yet attained. Like a Thaddeus Stevens or a Horace Mann, he is on the way to heights that have not been scaled. The progressive teacher is easy to to identify. He gives many evidences of growth. He keeps up with current events, and up to date professionally through reading, discussion, and conferences. His interests are broad, he associates with men and women who like to work. For him life is serious and challenging, but not too serious. He believes that: "The wisest men that e'er you ken, have never deemed it treason, to rest a bit and jest a bit and balance up their reason. To laugh a bit, and chaff a bit, and joke a bit in season."

The progressive teacher's shop, laboratory, or classroom group reveals self-activity as contrasted with teacher activity. He does not believe in docile submission to fate. He has faith — faith in the present and in the future which instills enthusiasm and is irresistible. As teachers, we have definite responsibility to develop in learners the quality or faith without which the vital needs of America and the world cannot be met. To succeed as teachers we must have faith in our goals, and in our ability to teach others how to achieve theirs.

It is clearly within the function of teachers of practical arts and vocational education to guide persons to hammer out, upon the anvil of experience, such steadfast faiths as those possessed by Jane Addams, Gladstone, Washington, Lincoln, Westinghouse, and Carnegie. All honor be to such courageous souls who pioneered that men today may live more abundantly; all honor be to the teachers who not only teach certain essential subject matter, but who also develop in their students *worthy purposes and a tenacious, sustaining faith*. In their care are we willing to trust our future progress, safety, and welfare.

Taking a Comprehensive View

We must not forget that practical arts and vocational education under public auspices are relatively new. During the last quarter of a century many of us have had our noses so close to the grindstone that we have missed something of the perspective that is needed. Many who have been uninformed or misinformed, have thought of practical arts and vocational education as being *narrowly utilitarian*. What could be further from the truth? The ability to make a living is at the foundation of individual and family welfare. It is the footing upon which all culture rests. Leisure and the pursuits of leisure cannot long continue unless a person can earn a living — unless he is vocationally competent.

In order to get an overview of how creative practical arts and vocational education contribute to the broad, inclusive social-economic goals, as outlined by the special committee of the National Education Association, appointed a few years ago, let us briefly examine these goals. The first is: *Hereditary strength*. The committee calls attention to the fact that: "the development of rich personalities depends upon the innate strength and capacities of individuals." Quite true. Practical arts and vocational education, when creatively taught, both contribute toward this objective for they make for wholesome, happy family life, for constructive patterns of behavior, and for healthful activities, all of which are factors that affect posterity and more specifically the inheritance of children yet unborn.

The second major objective mentioned by the committee is: *Physical security*.

Making shop teaching vital, purposeful, and far reaching.

This represents an ideal toward which successive generations have striven, and will continue to strive. To secure suitable opportunities for exploration and guidance such as pupils get through the practical arts, and to have the chance to learn socially valuable occupations, such as persons learn through vocational education, are clearly practical ways of furthering physical security. The instruction that is made available in the use of tools and machines in schools is given in ways that reduce accidents in adult life. This too adds to physical security.

The third major social-economic goal is *participating in an evolving culture*. In the broad sense "culture" refers to education, enlightenment, and refinement. Culture, as we interpret it, calls for ability to think and to do. But education that does not bear fruit can scarcely be called education. True culture must not be confused with a superficial familiarity with an outgrown yesterday, but is the product of creative effort. In our day no one can be considered cultured who does not have an appreciative understanding of how the world lives and works. Surely the practical arts, when taught creatively in the schools, are necessary to an evolving culture. In like manner, well-guided vocational education contributes toward enlightenment, refinement, and appreciative understandings, as well as toward vocational competence.

The fourth major social-economic goal is: *An active, flexible personality*. Common observation of our fast-moving life makes it quite plain that survival and growth depend upon our ability to adapt our behavior to constantly changing conditions. Now, if practical arts and vocational education were theoretical abstractions having little in common with life needs, one might well question their value toward developing "an active, flexible personality." But knowing as we do, that these areas of learning can be made to be particularly close to contemporary life, and understanding as we do, that both can be made to stress discriminating thinking, resourcefulness, and initiative in terms of actual life problems, it is easy to understand how, through creative teaching, they further the kinds of personality that are needed for a forward-marching way of life.

The daily working together in which each individual learns *habits* of adaptation

and of cooperation, such as are typical of well-taught practical arts and vocational education is, without doubt, more effective toward developing flexible personalities than can be produced by merely talking about the desirablity of having such personalities.

The fifth major goal mentioned by the committee of the National Education Association is: *Suitable occupation.* The committee states "A congenial lifework is a first requisite of a rich personality." Let us examine that statement carefully. It is a fine tribute to creatively taught practical arts and vocational education. Since well-directed practical-arts education makes it possible for individuals to find out for what lifework they are fitted, and since effective vocational education is directed toward giving specific competencies for a lifework, we may, in all fairness, paraphrase the previously quoted statement and say that *"creative practical arts and vocational education are essential means of a congenial lifework which is a first requisite of a rich personality."*

It is quite possible that many people who favor practical arts and vocational education for other reasons, have not caught the full import of such instruction as a *first requisite* to a rich, socially valuable personality.

Another major objective that the committee holds to be important is *economic security.* That should get a good, old-fashioned "amen" from everybody. Within the memory of most of us, we have experienced the most disastrous and far-reaching economic depression recorded in history. We believe that well-taught practical arts and vocational education help to bring about economic security by developing wholesome attitudes and ideals toward work, by teaching persons to enjoy work, and by establishing valuable work habits. Much economic insecurity is brought about by selfishness and inordinate lust for power. There are reasons to believe that when persons, under proper guidance, "rub elbows," as they do in school shops and laboratories, better mutual understandings are developed which will in later years, help to reduce misunderstanding between employers and employees, and between workers in one industry and those in others. Economic security without a vocation at which one can earn an honest, self-respecting living is an absurdity.

Another goal set up for American education is *mental security.* Creative work is the best-known antidote for worry. In these high-pressure days some form of practical-arts education, carried perhaps during leisure hours, serves as a safety valve for thousands. And similarly, some form of creatively conceived vocational education greatly reduces mental insecurity for additional thousands of people. One may lose his money in the stock market and his home through fire, but vocational competence, once attained, is not so easily lost. Many men and women feel more secure mentally because they know that they have acquired occupational proficiencies that will enable them to provide food, clothing, and shelter.

The committee of the National Education Association further suggests that *equality of opportunity* be a major objective in education. In the past this phrase has been interpreted too narrowly. Not only do we need far greater differentiation in high-school curriculums than we now have, but we need creative teaching all along the line so that each individual will get *equivalent* as distinguished from narrowly interpreted *equal* educational opportunities.

Two additional social-economic goals were suggested. The first of these is *freedom.* When we examine creatively taught practical arts and vocational education, it becomes evident that they make for freedom and for a freedom-loving people through the democratic way in which individuals learn to plan, work, and cooperate. When wisely guided, the nature of school shop and laboratory instruction is such that freedom can be, and is being, fostered.

The last of the ten major social-economic objectives calls for fair play. It is with pardonable pride that we point out that practical arts and vocational education are second to no other area of learning in their richness of opportunities for teaching ideals and habits of fair play under circumstances that are lifelike and real.

Creative Education is Life Centered

Education is change, and creative education is purposeful, life-centered change. Practical-arts education and vocational education, too, must stress appreciative understanding of life problems, it must emphasize appropriate manipulative skills and useful related learning. More than this, it should also give proper emphasis to character and personality development — to fitting persons for their responsibilities as citizens. If we believe that "the school is an agency of society to recreate society" all education must be focused upon the realities of life. In the life-centered curriculum, the subject matter is drawn from related aspects of life.

Those who see practical-arts education and vocational education broadly and who interpret it wisely, realize how readily valuable attitudes can be taught in school shops, and how they can function in adult life; how practical skills can be acquired and adapted to life requirements; how lasting appreciations may be developed, that will make future life experiences more interesting and meaningful.

Pathways to Fuller Living

Practical-arts education, creatively conceived, may be likened unto a series of pathways that lead to self-discovery and to appreciative understanding of the vast world of work. Vocational education, likewise creatively contemplated, may be compared to a series of pathways, each differing somewhat from the other, that help to reduce the remoteness of school instruction from occupational life, by bringing into the curriculum, content and procedures that prepare for effective work.

Creative practical arts and vocational education are not something that is merely added onto something else — like a chocolate covering on a layer cake. They are more like a chemical, which if added to others, transfuses and transforms the entire mass. Well-selected experiences in the practical arts and in vocational education give deeper meanings to life. Through practice more than through precept students learn to appreciate that all honest labor is noble, and that there are abiding satisfactions in service that is creatively rendered.

A Dynamic Activity

Creative education is active rather than passive. It stresses problem solving and discriminating thinking rather than rote memorization. Without losing sight of the eternal truths that have withstood the test of ages, *it places the major emphasis on the problems of today and of tomorrow.* It likewise places much emphasis upon developing self-reliance in each individual. Docility may be a virtue in a beast of burden that is used by man to serve his wishes. But who wants to be a Missouri mule? The objectives of our American way of life are better served by developing men and women who have self-reliance. The mention of women in this connection is deliberate. Many years ago a chief of the Cherokee Indians was asked to explain why it was that the Cherokees were so far in advance of other tribes. His answer was revealing. He said: "It is because we have educated our women as well as our men."

Creative education puts the emphasis upon developing initiative and resourcefulness as contrasted with conformity. To be sure there should be reasonable observance of well-founded conventions. But blind conformity has no place in a democratic program of education. What is meant by "initiative" may be illustrated by a story told about Admiral Dewey. When he was at Manila Bay with his squadron, he needed coal. So he purchased a large quantity of it without consulting the purchasing department at Washington. In due time correspondence came to Dewey from the chief of the Bureau of Equipment asking why he had bought so much coal. The admiral replied in two words: "to burn."

Ever since the earliest pioneers came to America, resourcefulnes and initiative have been characteristics that have been a distinct advantage to us as individuals and as a people. Creative education is a means of perpetuating these traits. Initiative and resourcefulness can be encouraged in ways too numerous to mention. Pupils can be encouraged to think for themselves, to work cooperatively, and to take responsibility. All this fits into our pattern of life. The kind of reflective thinking that can be taught through creative teaching is certainly better than that used by a man living in a place known as Pot-Liquor Flats, who mixed gin and orange juice which

made him intoxicated. He next mixed rum and orange juice. It had the same effect. He then tried whiskey and orange juice but that also made him drunk. In thinking this over, he came to the conclusion that, since orange juice was used each time, it must have been the orange juice that was intoxicating. We may laugh at the story but the fact remains, that we have too much of such loose reasoning.

The resourcefulness of American youth, to which reference was made, may be illustrated by the college professor who, in the closing discussion period of the course, admonished his students to apply themselves diligently to review the contents covered during the term. He closed with this final appeal. "There is little time left. The examination is in the printer's hands — we have but a few more minutes — are there any questions?"A brief moment of silence followed. It was broken by a voice from the rear which asked: "Who is the printer?"

Good education, as has been already stated, calls for worthy major goals or objectives. These are to the teacher what beacon lights are to the airplane pilot, and to the captain of the ship that is approaching a rock-bound harbor. But these comprehensive objectives of education must be translated into specific, functioning, properly organized units of learning. If that is not done, education becomes vague, nonfunctioning, hopeless idealism. Creative teaching, in any phase of education, will be evident in direct proportion to the teacher's ability to translate the larger goals of education into short, specific, and socially significant units of learning.

Opportunities for Adaptation

Practical arts and vocational education take second place to no other fields of education in opportunities that arise to use individual differences in learners as means for their advancement. Speaking of the field of general education, Ben D. Wood of Columbia University says: "For several decades we have been giving lip service to individualizing education, but the prescriptive curriculum with its correlative uniform mass standards still reigns supreme and almost unchanged."

Progressive teachers and administrators in practical arts and vocational education have long ago worked out ways and means of giving suitable recognition to individual differences in interest, aptitudes, and capacities. Pupils in the shops may usually select one of several projects rather than be required to construct identical objects; pupils in homemaking are often given a choice as to whether they make one kind of a garment or another. Individuals who have demonstrated outstanding ability are encouraged to undertake work that will challenge their best efforts, while others are guided to undertake work that is suited to their more restricted abilities. In every case the controlling thought in wisely planned instruction is to encourage maximum growth, and to give to everyone, no matter how limited or how superior in ability, a satisfactory sense of accomplishment.

In such ways the creative teacher of practical arts and vocational education helps each individual learner to experience the satisfaction of work well done. Many persons who have inferiority complexes, developed in an environment that was unsuited to them, have "found" themselves, and have replaced enervating attitudes by a sense of accomplishment and by faith in themselves, when they found that they could perform "practical work" as well as, and sometimes better than, others who outshone them academically.

Progress in education as well as in business and industry comes through procedures that vary from the normal, the conventional, the traditional. The creative teacher notices personality traits that vary from the normal. Sometimes they reveal special interests and talents that are worth encouraging. Many people who are very average or even below average in ability in most things, possess some special trait or gift to a degree that will make them widely known. Intelligent teachers are on the alert for such endowments.

The Newer Concept of Discipline

School discipline is something that goes far beyond the bounds of regulation and restriction. It is better to think of it in terms of the total influence of the school which is directed toward learning. It is a means of bringing out a better social order through developing in each individual right attitudes, suitable habits of conduct, appropriate patterns of thought, and worthy ideals.

In creative teaching the restrictive type of control with its emphasis upon fear is replaced by intelligent guidance. Control is recognized as an essential condition that makes learning possible. When pupils misbehave, the teacher tries to arrive at the underlying causes. Emotional stress of many kinds are at the root of unsocial behavior. In some instances such stress disappears when there is constructive, interesting work to be done. After all, there is a similarity between boys, and girls, and bees. Some colonies of honey bees were taken to a tropical island. The first year the bees worked hard to gather a supply of honey for the winter. But winter did not come. After that, they gave up their industrious ways. Having little else to do, they amused themselves by stinging the natives. From busy workers they changed to vicious drones. Constructive work is wholesome, natural, and necessary to happiness. Pupils never get into trouble when they work wholeheartedly, nor when they sleep. It is during idle moments that they get into trouble.

The ideal discipline is socially inspired and self-imposed. Its purpose is to make every tub stand on its own bottom. Firmness and fairness will go a long way in handling difficult cases. Prevention is better than correction. School management is at its best when it is natural, impersonal, unpretentious, and democratic. Challenging, constructive, socially useful work is the key to successful pupil management.

Motivating Learning

Persons who have had professional training in education know that the term *motivation*, as used by teachers, refers to stimulating individuals to learn. Motivation is important educationally because it calls forth greater effort, makes effort more enjoyable, and failure more annoying. Contrary to the opinions of some, the so-called "practical" activities largely involving learning of the motor type, need to be motivated just as does academic education. Long-continued repetition, such as is sometimes necessary in school shops and laboratories, can become very tiresome. For example, in the drafting room long-continued lettering may discourage some learners who would not give up if the instruction were properly motivated. In the print shop, typesetting which would otherwise become tedious, can be motivated by proper selection of material. The successful teachers of practical arts and vocational education have found it helpful to motivate learning through well-made assignments, and through models, objects, specimens, drawings, field trips, projection equipment, and in many other ways. Experience has shown that, in general, the most powerful motivating forces are those that spring from race-old behavior traits. Individuals as well as groups are swayed far more easily through the emotions than through the intellect.

Effective Learning

Among the more common causes of ineffective learning are: (1) lack of definite, worth-while goals, (2) accepting statements uncritically, (3) superficial habits of observation, and (4) difficulty in determining relative values. Such wasteful practices can be reduced by teaching pupils how to look for the hearts of problems, how to develop study habits, and how to select and organize essential ideas. It seems quite obvious that purposeful planning, thoughtful doing, and discriminating experiences in evaluation, such as learners perform constantly in practical arts and vocational education, may reasonably be expected to improve desirable habits of study. It is generally believed that it is definitely worth while to teach persons to study effectively, and that such guidance should be given at the earliest feasible age — certainly in junior and senior high school.

Teaching Aids and Devices

The better teachers use many aids and devices. They know what others have tried and how successful the result has been. They know that many aids are free, or may be obtained at a nominal cost. Sources of helpful materials are printed from time to time in professional journals. Workbooks are being developed. Diagnostic, achievement, and other tests are used for instructional purposes. Handbooks of various kinds are used. Trade literature is studied.

Displays are arranged and equipment devices are invented. Visual aids and the radio are made to serve useful educational ends. Instruction sheets are used, not to replace, but to supplement other teaching procedures.

Adult Education

A fast-changing social and economic order makes adult education imperative. The scope of adult education is very broad. Some of it is recreational and avocational, as is true in many cases in adult industrial-arts classes. Other phases of adult education are concerned with upgrading workers, and still others in job readjustment for unemployed persons.

Time is not available to elaborate on the many excellent kinds of adult education that are in operation. Our purpose here is merely to call attention to the challenging opportunities in a rapidly growing field of education that deserves hearty cooperation and support. Adult education is essentially a part of life — not a theory or an abstraction. It is used by all sorts of people in many sorts of ways to supplement and extend knowledge, skills, appreciations, insights, and understandings. In 1936 there were more adults who were taking some form of adult education than the number of boys and girls registered in the high schools in the cities that were studied.

Extracurricular Activities

Extracurricular activities are, at heart, hobby and constructive play activities that involve *personal effort and participation.* In this respect they differ from *entertainment,* which is a passive kind of enjoyment. A hobby is essentially a play activity. The list of extracurricular activities carried on in the larger schools is an extensive one. Among these, the craft clubs deserve mention. Many persons, both young and old, find them very interesting and helpful. To an increasing extent girls are being permitted to elect industrial-arts activities, and boys are getting worth-while instruction in home economics, sometimes labeled "camp cooking" to make it more appealing to boys who might otherwise shy away from what has traditionally been women's work.

Summary

To summarize, we may say:

1. Man works best when he labors in the spirit of the artist-craftsman. To such, creative expression is a deep source of lasting joy.
2. To teach most creatively we must have a deep, abiding faith that life is more than temporal.
3. In practical arts and vocational education it is desirable to keep in mind large, social-economic goals that will help to determine means and methods of teaching.
4. The comprehensive goals of practical arts and vocational education must be translated into smaller, specific, properly organized units of learning.
5. Instruction must be life centered.
6. Creative teaching seeks to develop flexibility, resourcefulness, and initiative in learners.
7. Discipline is a necessary condition to effective teaching. According to the newer concept, "discipline" refers to the total influence of the school which develops proper attitudes, ideals, habits, and patterns of thought.
8. The better teachers motivate learning in many effective ways.
9. Those who teach creatively use many special aids and devices to make their instruction interesting and helpful.
10. No program of practical arts and vocational education is complete unless it provides for adults as well as for younger persons. We are never too young or too old to learn.

This last statement, that we are never too old to learn, may be illustrated by the following story: When the poet Longfellow was well along in years, a visitor once asked him: "How is it that you remain so robust and continue to write so beautifully?" It was springtime. Longfellow pointed to the open window and said: "Do you see that apple tree? It is an old tree, but its blossoms are as lovely as they have ever been. I suppose it is because each year the tree grows a little new wood and the blossoms come on it. Like the tree, I try to grow a little new wood each year." May we, like Longfellow strive to grow a little new wood each year.

Broadening Responsibilities in Industrial Arts

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This article has been prepared from the stenotype record of an informal address of one hour. Despite reduction of approximately one half, the full range of the address is included.

Reference has been made, in introducing me, to the fact that I received my early preparation and began teaching in your state. The last Wisconsin position was here in Milwaukee; it extended over a six-year period closing in the fall of 1919. Therefore, the absence has continued twenty years but attachment to friends, schools, and towns in this state has not abated. Wisconsin origin is prized by all who can claim it because this state has always been progressive in laws and services, and particularly with reference to functioning types of education.

In the field of industrial education you have long taken and held forward positions and have served as stimulus and model for developments elsewhere. It must be said that, without your dual system of administering the vocational-education program, the work in this state would be less far advanced and the work in other states would be correspondingly retarded. This circumstance does not establish the dual system as correct for American education. Despite acknowledged successes you provide the clearest example of separatism at a time when large majorities in industry, business, agriculture, religion, and political life are striving toward unified systems. If I may suggest educational improvements for our home state, they would be (1) that general and vocational education draw closer together; (2) that day and evening programs become gradually blended; and (3) that industrial arts and trade training be less clearly differentiated.

Let us now turn to the outline which has been passed among you. These are the only notes at hand and I want to use the time allotted to run through this list, more or less in order, but missing many of the items. During the later discussion period this sheet will prove useful in saving our time. Those who then desire further elaboration of any point, or who want to ask a question related to any point, may do so conveniently by using the code. One may say, for example, "I would like to know a little more about what you mean under E-3" and another listener may say, "I have a question under F-5." The code will serve to place questions before us, definitely and quickly.

We are assumed to be limited this afternoon to discussion of industrial arts, although I think each year the general and vocational phases of industrial education become more interlocked. These are really unlike in purpose and emphasis but they are seen more each year to be mutually sustaining. It becomes more difficult to

Lecture and Discussion Outline

NOTE: Assuming a discussion period, eleven items are listed in this outline under each of seven headings. If you have a question please make it clear and brief by making code reference to one of the items. (Example E–7.) The seventy-seven items are merely suggestive, and discussion is not restricted to them.

A
Field Purposes

1. Full development
2. Enrichment of other subjects
3. Planning ability
4. Exploration and guidance
5. School morale
6. Leisure interests
7. Personal traits
8. Selection for training
9. Foundation for trade courses
10. Preparation for minor jobs
11. Work and life attitudes

B
Public Desires

1. Motivation
2. Information
3. Appreciation
4. Skill
5. Exploration
6. Preparation
7. Placement
8. Upgrading
9. Retraining
10. Marginal facility
11. Adjustment

C
Types and Levels

1. Elementary school
2. Junior high
3. Senior high
4. Junior college
5. University
6. Graduate school
7. Evening classes
8. Trade preparatory
9. Cooperative half time
10. Apprentices
11. Certain teachers

D
School Groups

1. Girls
2. Subnormals
3. Low normals
4. Farm shop
5. Homemaking
6. Fine arts
7. Physically handicapped
8. Early leavers
9. Clubs
10. Private and parochial
11. Neighboring small schools

E
Outside Groups

1. Scouts, the Y, etc.
2. C.C.C. camps
3. Community houses
4. Summer camps
5. Home workshops
6. Industrial adults
7. Non-indu. adults
8. Grads, out of work
9. Dead enders
10. Bed-fast or shut-in
11. Continuation

F
Constant Problems

1. Content analysis
2. Course organization
3. Equipment and space
4. Materials and supplies
5. Methods
6. Management
7. Art and design
8. Credit maximum
9. Projects and jobs
10. Local supervision
11. Teacher preparation

G
Some Suggestions

1. Reservoir groups
2. All-year positions
3. Research projects
4. Certification
5. Public relations
6. More media
7. Teaching versus tutoring
8. State supervision
9. Federal aid
10. More measurement
11. Administrator's professional courses

know where one leaves off and the other begins — where what we have taught changes from a casual to a definitely vocational element in a student's thinking or life. Let us hope the time is near when administrators and boards will be more concerned about the progress made by youth and the selected individuals who instruct them than they are about what budget, building, or certificate be involved.

Set A. Field Purposes

Here we see listed some of our older responsibilities. To broaden them does not necessarily mean to extend the list; it is more a matter of emphasis and change than of addition.

(A-1) We have always accepted responsibility for contributing something special to the *full development* of a youngster. We think that some time each day, throughout a number of years, should be given to manipulative processes in a wide scatter of materials in order that a youth may understand the environment and himself in a way not guaranteed by academic work alone.

(A-2) We believe that industrial arts *enriches other subjects* but we do not wish to give so much attention to correlation or integration that our own subject suffers. I have no patience with spoiling industrial instruction while attempting to make it contributory to the aims and attainments of academic teachers.

(A-5) Next, the matter of *school morale*. There was a time when most of our students were those who did not progress in the older subjects. We did our best for these people. There is no doubt that our subjects, facilities, and management schemes did much for them in the realm of morale but this was an incidental aim or outcome. The matter of a pupil's school morale must now be raised to the status of a major purpose of our work. Industry does not want youth. If these boys and girls must stay in school they must be led to like to stay in school and we must contribute heavily to this end. Let us assume, henceforth, not an incidental part in the heightening of school morale but a definite assignment to make thousands of youngsters contented to stay — the like of whom were not with us ten years ago.

(A-6) *Leisure interests* must engage our attention in a different way, also. Through the shorted day and week and the reduced total work span, people are already faced with more leisure. Some find this condition difficult because of narrow interests, lack of money, and the newness of the situation. If we can lead more people to design, construct, repair, finish, model, etc. — by reason of youth and adult instruction in the crafts and arts — we shall play an important part in individual and social reconstruction. Here, again, an incidental purpose of our work becomes an aim of higher magnitude.

(A-8) *Selection for training.* As the years pass there will be the necessity for higher and higher selection of those to be prepared for the skilled or aristocratic trades. It becomes an objective, a definite responsibility of the industrial-arts department, to assist in locating those individuals whom the public would be justified in giving long, expensive, and technical preparation. The recommendation of an experienced industrial-arts teacher would be more acceptable to me, in this regard, than the score on any test or battery we now have. Industrial-arts teachers should be requested to nominate pupils for trade schools, art schools, engineering colleges, and the like. Certainly, they should help to select those most likely to develop into excellent industrial teachers.

(A-10) But there are the *minor jobs* to be thought of by us and to be engaged in by millions of people of all ages. Industrial arts is, without doubt, the best possible preparation for a host of such occupations at a range of levels. Some people advocate expansion of the trade and technical schools to include these lower-grade employments. I would prefer that industrial-arts equipments and plans be changed or extended to include general, and later specific, preparation for these types of work below the few skilled trades.

Set B. Public Desires

It is one thing to have developed and announced some clear and attainable objectives of our field or curriculum area. It is quite another thing to compose these objectives with what a largely uninformed and changeful public expects in the way of results. Right or wrong the public has rather specific desires which must be met, explained away, or replaced by acceptable substitutes. The public's expectancies are commonly whole-school rather than departmental or subject expectancies.

(B-1) *Motivation.* The parents desire that we instill in their children desires to be someone, to go somewhere, and to become socially and economically worth while. If they have become warped or lost, they expect us to straighten them out and to place their feet again in the path of progress. They want us to help them choose careers, to become prepared, and to find and hold work. The "practical" courses accomplish these expectancies more surely than other school subjects and I would place the social sciences second in this respect. Certainly, parents are eager that their sons and daughters attain, in final full-time contact with schools, some salable skills and some helpful attitudes.

(B-6) *Preparation.* Some people seem to think that industrial-arts courses afford no

preparation. They say, "Let him stay there until he is a little older, than we'll send him to the trade school or put him into apprenticeship." They have no thought that the boy or girl in question may not be capable of learning a high-class trade or that vocational schools are commonly clogged with unworthy and indifferent pupils. Perhaps, for 85 per cent of those who will ultimately engage in industrial pursuits, the good industrial-arts departments have more to offer in the way of preparation than the trade schools, even if these were very widely scattered. Versatility, adaptability, breadth, etc., are born of varied industrial-arts experiences. This pattern of readiness is in increasing demand. Industrial arts must provide this firm foundation for permanent employment on the part of the great majority of our young people. Trade schools must either become more selective or must do more for all, or for many of their students, of the industrial-arts type of instruction.

(B-7) *Placement.* Of course, we should improve in this line. In a large or fair-sized city I think placement divisions in junior and senior high schools and in vocational schools are preferable to downtown central divisions. After all, good placement depends more upon intimate understanding of the individuals than upon voluminous records in the hands of persons unacquainted with those to be placed.

(B-8) *Upgrading* has grown in importance and effect in connection with our strictly vocational schools. There are still hundreds of thousands who would profit by refresher courses but who cannot find courses matching their growth needs or job-security demands. I would reserve evening-trade schools for upgrading instruction for persons in skilled trades and for the learning of new trades. All industrial-arts shops would then be opened certain evenings of the week and on Saturdays to accommodate the nonindustrial patrons. These responsible citizens have urges to work with their hands and to learn things useful to them in fields other than trades. The necessary rulings under federal aid have hindered the growth of evening instruction for other purposes equally worthy. Industrial arts can do upgrading of a high order for a much larger number.

Set C. Types and Levels

We have our school systems organized in types and levels and the point to be made here is that these several stages or units should become more distinctive. Industrial arts in elementary, junior high, and senior high schools should not be just a little more difficult as progress is made. These institutions wouldn't have different names if they were merely graded in advancement. The activities at the several levels should not only be increasingly exacting but fundamentally different, in keeping with the strict purposes of the schools.

This means that teachers at the several levels must know and hold rigidly to these purposes and that they should be selected and prepared with positions by types and levels in view. We now have men in vocational schools some of whom belong in junior high schools and some in engineering colleges. Teachers should be assigned according to objectives, student maturity, etc., rather than by degrees, years of trade or professional experience, friendship with a principal, or nearness of a home to a schoolhouse.

(C-4) *The junior college.* These should be terminal in great part insofar as industrial courses are concerned. Nevertheless, for those planning to become engineers, dentists, industrial teachers, etc., there should be the opportunity for advanced industrial-arts instruction. I expect to see the junior college develop into an important placement area for selected men now teaching in the lower schools. Advanced degrees will be important in these transfer or overlapping situations but industrial teachers are alive to this condition.

(C-9) *Cooperative half-time training* plans are increasing in most states and are now much less restricted to urban centers. This expansion into the smaller schools will bring added responsibility to those industrial-arts teachers who become interested and make necessary preparation. Someone in each school must accept promotional and supervisory duties in connection with these new arrangements and must be ready to offer content for courses that is not of the usual variety. Ten years will bring us thousands of new positions of this type.

(C-10) *Apprenticeship* is growing, as you must know. In cities having vocational schools the relationship will be close because contracts will require, in most cases, that related instruction be acquired under formal school conditions. If we are not to see apprenticeship restricted to large cities or greatly limited in the scatter of occupations involved, some way must be found to provide the related work for isolated apprentices in a variety of fields. Experienced and alert industrial-arts teachers should look forward to fitting their talents and knowledges into the rapidly expanding apprenticeship scheme.

Set D. School Groups

Aside from the normal going classes to which we are accustomed there are certain trends of addition.

(D-1) In some schools a few *girls* are being admitted to boys' classes; in other schools girls and boys are assumed to take these courses in the usual mixed groups at certain grade levels; and in still other schools there are separate classes for girls. We seem to be passing out of this experimental stage and industrial-arts teachers must take note of this change.

(D-2) *Subnormal* groups are common and have been handled largely by specially prepared teachers. This plan seems likely to be continued but the industrial-arts teacher's responsibility for at least some of these pupils will undoubtedly increase. We should be learning the psychology and method of this special field of service.

(D-3) Just now there is real concern about a group just higher in the scale of possible attainment, characterized as *low-normal* pupils. Even this fall the United States Office of Education has held a conference concerning the contribution which industrial arts may make to the progress of these students. Subnormals will remain in about the present ratio but low normals are likely to increase, as young people are denied places in industry and as the school-attendance laws are modified in consequence. Industrial-arts teachers must become energetic in sensing and meeting the needs of boys and girls who cannot become professional workers and who cannot be prepared for effective service in the basic, intensive trades. It is my conviction that subnormals will remain segregated but that low normals will remain scattered in our other classes. We shall learn to identify them, to present them appropriate activities and problems, and to maintain helpful attitudes in working with them.

(D-4) *Farm shop.* The industrial-arts teacher has the skills and information while the agriculture teachers know the special aims and needs — all of which are requisite to effective farm-shop instruction. The question constantly arises as to which type of teacher is ultimately to become actively responsible for this important type of work. I hope I am unbiased in the belief that this course logically belongs as an addition to the industrial department. Our teachers may well begin to cooperate more closely with teachers of agriculture and to avail themselves of the assistance so fully and freely provided by the land-grant colleges. This new duty is drifting toward us.

(D-8) What are we doing for the *early leavers?* Every school has some pupils, some schools have considerable groups, who are within a few weeks of breaking contact with the formal processes of education. Some teacher in every school should busy himself to identify these individuals and to do something special for them in the remaining time, with utter disregard for curricular sequences and normal practices. It would seem that the industrial-arts department is most appropriately thought of as being ready to make a showing on this problem. The approach may well be social and of a guidance nature without overdue emphasis upon manipulative activities.

(D-11) Our superintendents and principals continually consider equality of opportunity in education and the enlarged unit of administration is often mentioned in this connection. What about industrial arts for boys and girls in *neighboring small schools?* Lines may well be broken down, at least on all of the "practical" and more expensive courses. New plans should be instituted whereby students of rural and small-town schools may take our type of work in convenient and larger centers.

Set E. Outside Groups

(E-2) What are we doing about outside groups, the *C.C.C.* camps for example? These institutions are likely to be con-

tinued regardless of national administrative changes through the years. Are these educational arrangements to go on without our help and largely without representation of our specialty? If they do, it is conceivable that the schools may become thoroughly academic and that they may be assumed to be supplemented, for each pupil, by a period in some such outside program. It is time for us to read and to observe the workings of and the changes taking place in all supplementary or complementary educational agencies.

(E-4-5) *Summer camps, home workshops,* etc., are now common in our experience, constantly expanding, and certain of continuance. These are good, socially and economically. Moreover, they are highly attractive in that they match inherent urges and needs. Are we doing our share to give worthy direction to these activities and coveted assistance to those sponsoring and participating in them? These are but beginnings in an area filled with promise for those who are versed and skilled in industrial arts. Here we have opportunity and responsibility nicely blended with a pinch of protection thrown in.

(E-1-3) Industrial arts has begun to carry its influence in many new directions — *scout troops,* community houses, craft centers, etc. These are direct offshoots and extremely logical extensions of our professional interests and activities. These are what we have hoped for. We used to hear the slogan — "I hear America singing." Why not another one to give expression to a new desire of the people now coming forcefully to play? America is now becoming conscious of the joy of using tools and machines on an amazing variety of materials. A really good slogan might be worth a million dollars and a million strong supporters.

Industrial arts promotes business, because it demands equipment and supplies both in the school and at the homes, camps, and elsewhere. This enormous economic item could be increased tenfold if our work came to embrace girls as well as boys, the evening leisure classes as well as the day-school courses, and the private and parochial schools as well as the public units.

Set F. Constant Problems; and Set G. Some Suggestions

Our time is drawing to a close and we can spare only a sentence or two on a few of the remaining items, without reference by numbers.

We must *analyze* more occupations for *content;* we have limited this important work to a few basic trades. We know too little, even now, about the techniques of *course organization, methods,* and the *management* of classes of varying purpose and size. *Local supervision* needs special study and attention, it being practically absent in situations where it is assumed to be good. *State supervision* is at particularly low ebb insofar as industrial arts is concerned when we consider the nation as a whole. Many states, including Wisconsin, are without specially trained state supervisors in the field — while there is constant increase in the number of officials held responsible for trade training. These two services are equally important. The numbers of schools, teachers, and students involved in them usually show heavy margins in favor of industrial arts. For this numerical reason only, an industrial-arts supervisor on full time is thoroughly justified for every state department.

It is my belief that industrial-arts teaching should be an *all-year position.* If the agriculture teacher of the community can justify his remaining for most of the summer it could be similarly established that the industrial teacher is needed. He may well be employed for the calendar year, with a brief vacation with pay, and might be permitted or required to take leave periodically for professional improvement. Thoughtful parents should be able to visualize summer usefulness for these trained, resourceful, high-minded men who are well acquainted with their sons — often better acquainted than they, as parents, are.

Now we have exhausted our scheduled time and are ready for a question-and-answer period. Who will volunteer a topic?

Questions and Reponses

(D-9) *The question is about clubs.* Assuming that club activities are properly controlled there cannot be too many such groups; otherwise, a school may be clubbed to death. There should be at least one club to which pupils of mechanical interests would gravitate. An informal organization is more effective in certain fields than a class or course because the group becomes self-elected and homogeneous.

What about the time of club meetings? They should be on school time rather than after. Some institutions have extended the day to make this possible, although the club meetings are not all at the end of the day. Where there is a really active club, with an excellent leader, pupils may well be excused from conflicting classes. As years pass we may expect fewer courses and more meetings of groups selected according to definite interests and aims.

(F-6) *The question concerns management.* Our chief difficulty is the increased number of students, not only by classes, but in the total number of individuals with whom a teacher works in a day, week, or semester. For shopwork, the crux of the matter is to have sufficient work stations and adequate individual equipment. Management, to me, doesn't mean that the students should "take over." I have known a few teachers capable of controlling a truly democratic and social student personnel or management scheme. Here students make real gains in leadership, followership, cooperation, etc., but such cases are rare. I have seen a few setups where I thought the personnel plan was wagging the work. Nothing much except management was in evidence. In other words management can go to seed even where it is called superior.

Is the material you have covered here available in printed form? I haven't anything here today beyond what you have — the outline. I may have said some of these things before in writings, classwork, or other lectures. We make progress, not by doing a lot of new things, but by selecting some few ideas for emphasis and for development in several directions. If you will write to me about some specific matter perhaps I can send you something or tell you where to find a printed treatment of the topic.

(E-2) *The question is about C.C.C. camps as to how far they have gone in industrial instruction.* I think they haven't gone very far. At least, I haven't been able to find any worthy industrial-arts or trade preparation in the camps that I have seen. They may be putting discount on what we have developed. They have done some fine things and are worth what they have cost. They have done some good work in health, vigor, morale, morals, general information, work attitudes, etc. There could be a good industrial-arts development in each of these camps. Perhaps we can help on this.

(G-2) *The question concerns all-year positions.* The teachers over a region or a state — through an Association like yours — or by cooperating on a master's thesis at a University — could draw together a list of what men do in summer in their communities. We could later, after extension and organization, present superintendents and boards with a detailed pattern of a teacher's summer activities. Some items might be: teaching a course, with or without credit, supervising construction or repairwork for the school or the park, conducting athletic games and contests, giving lectures and demonstrations related to home workshop projects, making trips to industries locally or in larger towns. A good industrial-arts man, whom the boys like because he likes them, would be very valuable in any town any summer. We can be there if we request and plan to be there. Yes, this might interfere with a teacher's self-improvement program. I would take care of that in the contract — an all-year position, a brief vacation, periodic leaves perhaps of three months every third year to go to school, travel, work in the trade, etc. The all-year teaching position is far from impossible.

This country is rapidly becoming vocational-education conscious. While there has been a marked expansion in the vocational educational facilities of the country under public auspices, the demand for such facilities is much in advance of the development. The whole program of occupational adjustment is being broadened to include guidance, specific occupational training, placement, followup, and retraining and readjustment activities. — *L. H. Dennis, executive secretary, American Vocational Association.*

Our grand business is, not to see what lies dimly at a distance, but do what lies clearly at hand. — *Carlyle.*

Motion Pictures in Industrial Arts

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The old Chinese proverb "a picture is worth a thousand words" may be a time-worn expression of thought but is even better logic than it was a thousand years ago.

Modes of living have become increasingly complicated due chiefly to the invention and improvement of modern machinery and processes. Leading educators are now beginning to utilize a modern invention (the silent and sound motion picture) to teach the American youth, as well as adults, many things that are difficult or impossible to teach otherwise.

In 1893 Thomas Edison exhibited the first motion picture employing film. In 1896 the first public motion picture was shown in New York.

The motion-picture technique was gradually improved until 1928 when sound effects were added to the film by means of a sound-wave track near one of its edges. This improvement, together with technicolor, have vastly improved the motion-picture possibility as an educational tool.

It is difficult for us to realize the tremendous influence exerted by motion pictures in our nation today. In 1936 approximately seventy million American people came under its positive and negative educational influence weekly. Today it is the greatest influence in shaping the thoughts, actions, and attitudes of the people of our nation.

Since 1930 the public schools of America have made rapid strides in the development and use of sound motion pictures. In 1929–30 the Chicago public schools used only 650 educational films; in 1935–36 they used 60,000. In 1929–30 the Rochester, N. Y., schools averaged only 5 films per day, while in 1935–36 they were using an average of 58.

Audio-visual motion-picture education implies simultaneous education through sight and sound. Experiments have shown that approximately 75 per cent of our learning impressions are obtained through visual and auditory sensations.

Realizing the possibilities of the sound motion picture as an educational aid, our leading educators are giving much thought to its use in our schools. Speaking of educational motion pictures: Alexander J. Stoddard, Supt. of Denver, Colo., Schools, says:

"A broader preparation must be made for adult living. What is needed is sufficient education to sit on 'the bleachers' of life, so to speak, and to be able to understand the game and claim what it may include for the enrichment of the life of each individual. Motion pictures are a means of supplying this need."

Deam Holmes of Harvard University has the following to say regarding motion pictures:

"When proper motion pictures are used to supplement the textbook in class, the knowledge of the student is increased from 20 to 40 per cent."

The implications of educational films are many and a plan of evaluation must be used if the greatest good is obtained from them. Before films are scheduled for use in our schools they should be studied from the following viewpoints:

1. Does the film correlate with the subject matter of the course of study?
2. Or, if used for assembly programs, is the film of sufficient general educational value to justify its use?
3. Is there evidence of good educational methods in its construction?
4. Is the material contained in the film of such nature that it cannot be easily presented otherwise?
5. Does the language, length of scene, and sequence suit the grade level intended?
6. Is there enough repetition and a summarization?
7. Is it accompanied by written material or units of instruction to form a study guide?
8. Does it develop proper attitudes, ideals, and appreciations?

Some specific advantages the audio-visual aids educational program affords:

1. It presents some things in a way that cannot be presented by either sight or sound alone (ex., sound waves — time lap microscopic photography).
2. Large groups are accommodated.
3. Saves instructional time.
4. It utilizes a combination simultaneously of two chief sensory organs (the ear and the eye) which are responsible for the greatest part of the education of normal individuals.
5. It eliminates the problem of place and distance, as real life situations may be brought into the schoolroom.
6. Our classroom laboratories become world wide.
7. Through its medium the voice and actions of great men may be preserved for future generations.
8. The advent of technicolor films makes the study of art, botany, architecture, and similar subjects more realistic.

Educational films may be used in our schools in the classroom, and in the school assemblies. Those used in the classroom usually impart correlated information for the specific subject. The films used for school assemblies are usually more of a general nature and deal with world geography, customs, international understanding, and safety.

Urging the use of silent and sound movies for clarifying industrial-arts and vocational-education courses.

Suggestions on using visual aids:

Motion pictures are most effective when used in connection with other related materials. Education films to be acceptable, must be developed in a way to recognize the laws of learning, meet the requirements of the curriculum and be in accordance with good educational philosophy.

1. They must be adapted to the ages and groups.
2. They should be used for specific purposes: to teach related knowledge, to classify subject matter, to broaden the world horizon, etc.
3. Adequate preparation should be previously made so students will be in a receptive mood.
4. Pictures should be followed by oral discussion or written tests. This places a responsibility on the student.
5. Sometimes a second showing of the film is helpful to clear up questions.
6. If carefully prepared, running comments by teachers are helpful when silent films are used.
7. Most teaching films and slides are accompanied by a syllabus. These should be carefully studied and used in connection with the pictures.
8. Films should correlate with the subject matter, both in content and in time of presentation if the greatest benefit is to be obtained.

It has been somewhat difficult to obtain good motion-picture films for school use. This is due to the reluctance of commercial producers to release strictly educational parts of their films, and to the lack of finances in the educational field for producing their own films. However, this condition is not peculiar to the field of audio-visual education since all new theories and practices in the educational field are looked upon with suspicion. Plans are now being made where the better classic films will be made available for school use and it will be only a matter of time until sound motion pictures will occupy a vital place in the school curriculum of the country.

The general discussion of motion pictures as stated in the foregoing, is of vital concern to industrial teachers of shop subjects for two reasons:

1. Since our subjects are part of the school curriculum we should be interested in general educational theories and practices.
2. Teachers of shop subjects are tech-

nically trained and together with science teachers are the logical ones to have charge of the technical side of the school motion-picture program.

While this additional responsibility involves considerable expenditure of time and energy, real service in the cause of education calls for sacrifice on the part of those interested in vitalizing and improving teaching methods.

The problem of financing this late addition to the school program may next be considered. This cost varies so greatly that no attempt will be made here to itemize the expense. However, a limited program can be established by renting projection equipment made available by many state universities and then obtaining free films from universities and some commercial agencies. Special films may also be rented from these sources at reasonable cost. It will be found that good 16-mm. silent motion-picture projectors can be purchased at a cost of from $60 up and sound projectors at a cost of from $300 to $600. If extreme care is exercised in selection of films from all available sources a modest program may be launched in the smaller schools at a cost of $20 to $50 for film use per year. Many schools follow the practice of charging students a small fee and pay for film use in this way.

Like all progressive educational tools, motion pictures may enrich and vitalize the curriculum or may become an educational toy if carelessly and aimlessly administered.

Following is a representative list of films available for use in industrial-art classes. Many other subjects of the curriculum have a greater variety of films now available for class use.

Title	Reels	Size in Mm.	Sound	Silent	Cost	Distributor
ABC of Forestry	1	16 or 35	x	x	free	A*
Art and Architecture	3	16		x	rent	B
Big Timber	1	16	x		rent	C
Books	1	16		x	free	D
Books, from Manuscript to Classroom	2	16	x	x	free	D
Boulder Dam	4	16		x	free	E
Bridging San Francisco Bay	3 & 4	16	x			F
California Giants	40 min.	16 or 35	x		free	G
Cedar Camps in Cloudland	1	16		x	free	H
A Concrete Example	2	16		x	free	H
Conquering the Jungle	1	16	x		free	I
Conquest of the Forest	1	16		x	free	J
Crossroad Puzzle, (safety)	2	16	x			K
Diesel, the Modern Power	2	16	x			L
Drive is On	1	16		x	free	J
Electric Arc Welding	1	16	x		free	M
Enemies of the Southern Pine	1	16		x	free	N
Fabricating the Western Pines	2	16 or 35	x		free	N
Forest Treasures (manufacturing of veneers)	3	16	x		free	O
From Mountain to Cement Sack	1	16		x	free	P
From Swamps to Workshops	1	16		x	free	N

Title	Reels	Size in Mm.	Sound	Silent	Cost	Distributor
Furniture Making	1	16		x	rent	C
High School Opportunities	2	16		x		Q
Learning to Fly	2	16		x	free	R
Little Swiss Wood Carver	1	16		x	rent	C
Lumbering in British Columbia	1	16		x	free	J
Manufacture of Mahogany Lumber	2	16		x	free	S
Man and Machines	1	16	x			C
National Park Pictures		16	x	x	free	N
Oil--The Wood Preserver	1	16		x	free	N
Power	2	16		x	free	T
Simple Machines	1	16		x	rent	C
Steel, Man's Servant	4	16	x		free	F
Story of Power	3	16		x	free	U
Story of the Canadian Pine	3	16	x		free	L
Teak Logging with Elephants of Siam	1	16		x	rent	V
The Doings of Turp and Tine	2	16		x	free	W
The New Continuous Process of Making Iron and Steel Sheets	3	16		x	free	X
The New Frontiers	2	16	x		free	Y
Story of Nitrocellulose	3	16		x	free	W
Trail of the Longleaf Pine	1	16		x	free	N
Uses and Abuses of Twist Drills	1	16		x	free	Z
Why be Careless?	1	16		x	free	XX

*
A--U.S. Dept. of Agriculture, Washington, D.C.
B--Walter O. Gutlohn Co., 35 W. 45th St., New York, N.Y.
C--Bureau of Visual Instruction, University of Kansas, Lawrence, Kans.
D--John C. Winston Co., 1006 Arch St., Philadelphia, Pa.
E--U.S. Dept. of Interior, Bureau of Reclamation, Washington, D.C.
F--U.S. Steep Corp., 71 Broadway, New York, N.Y.
G--California Redwood Assn., 405 Montgomery St., San Francisco, Calif.
H--Western Electric Co., Motion Picture Bureau, 120 W. 41st St., New York, N.Y.
I--Goodyear Tire and Rubber Co., Akron, Ohio
J--Canadian Gov't. Motion Picture Bureau, Ottawa, Can.
K--American Automobile Assn., 66 E. South Water St., Chicago, Ill.
L--National Y.M.C.A., 347 Madison Ave., New York, N.Y.
M--General Electric Co., Visual Instruction Section, Schenectady, N.Y.
N--Western Pine Assn., Yeon Bldg., Portland, Oreg.
O--Veneer Assn., 616 South Michigan Ave., Chicago
P--National Tube Co., Mississippi Valley Trust Bldg., 516 Olive St., St. Louis, Mo.
Q--Public Relations Dept., Illinois Educational Assn. Springfield, Ill.
R--Curtiss Wright Corp., 240 W. 57th St., New York, N.Y.
S--Mahogany Assn., 75 E. Wacker Drive, Chicago
T--Stone and Webster Engineering Corp., 49 Federal St., Boston, Mass.
U--Bureau of Mines, Pittsburgh, Pa.
V--University of Wisconsin, Madison, Wis.
W--Hercules Powder Co., Wilmington, Dela.
X--American Rolling Mill Co., Middletown, Ohio
Y--Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.
Z--Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, Ohio
XX--John Hancock Mutual Life Insurance Co., Boston, Mass.

General Electricity

Joseph P. Henley

Lincoln High School, Cleveland, Ohio

In the spring of 1935 the director of industrial arts in Cleveland, Mr. Frank C. Moore, felt there was a need for the development in our junior and senior high schools of a course in practical, general electricity which should be substantially different from the existing courses, and he therefore commissioned the writer, an instructor at Lincoln High School, to set up a new experimental electrical shop and course of study in which the boys could learn more practical work than electrical theory. This should in no manner be interpreted as an indictment of electrical courses offered in the trade and technical schools. Mr. Moore's attitude in this respect was undoubtedly influenced by a growing realization that although electricity has for more than fifty years been playing an important part in our daily lives, the average individual has no real knowledge of the subject.

It was just 60 years ago that Thomas Alva Edison turned darkness into light through the magic of his great invention, the incandescent lamp. From this humble beginning the electrical industry has, within the memory of many of us, grown to giant size. The genius of this famous American has made the United States the greatest user of electricity in the world. Last year one hundred billion kilowatt hours of electricity were used in American homes and factories, an increase of 900 per cent in the past twenty-five years. Today, 70 per cent of our homes have electric lights. Ninety-three per cent of these homes have electric irons, 56 per cent have electric washing machines, and half of them are equipped with refrigerators, vacuum cleaners, and clocks operated by electricity. Four out of every five homes have a radio — many of them two or more. And with rural electrification progressing rapidly, these percentages will soon be materially increased. Today on some of our farms much of the work which was formerly done by hand is done by electrically powered machines. Even truck gardeners are beginning to use hotbeds heated with electric cables running through the soil.

The value of a study of electricity to the student in this technological age.

Because of this widespread use of electricity, affecting as it does so many people in their everyday lives, any student who is deprived of an opportunity to study electricity and its use is at a definite disadvantage at the start of his productive years, regardless of his future vocation.

In support of this contention let us first consider what the course contains in respect to opportunities. In a practical way, the fundamentals of electricity are presented. A variety of suitable projects for boys to construct have been developed; such as electromagnets, etching pencils, motors,

transformers, radios, and soldering irons. In addition, pupils bring to class a variety of electrical home appliances, such as irons, toasters, heaters, lamps, and motors, which need to be repaired. Successful execution of the skills involved in the performance of these tasks necessarily carries with it a study and understanding of the common appliances, devices, and equipment; the proper use of standard tools, materials, and equipment; electrical apparatus, meters, and circuits; the control of electricity, so that it will be safe, useful, and practical; and related information. Correlation with other school subjects also is provided.

Let us consider next what the writer prefers to refer to as "functions" of the course; the same as the objectives and guiding principles set up in Ohio High School standards for 1937; namely, "orientation, technical, avocational, consumer, social and cultural."

The Orientation Function. Since it is the function of the school to prepare students for successful participation in the activities in which they will engage after they have passed from its halls, inclusion of this type of electrical course within the school's curriculum is in line with progressive adjustment of education to existing life conditions.

Our complex industrial life of today is making more and more demands upon habits and skills attained from the usage of tools, materials, processes, and products. Electrical knowledge acquired through simulation of actual industrial experience enables the student to recognize the foregoing as a truism and to realize its indispensability in attaining any degree of success toward attaining a livelihood for himself and those dependent upon him. Simultaneously he will gain a better conception of the proper relationship toward his fellow workers and industrial civilization. To state it briefly, this orientation function is an educational and occupational guidance which is so vital in this technological age.

The Technical Function. To help project the knowledge of electricity into specified interests.

Since it is a well-established fact that we are living in an industrial age, the trend of education must of necessity effect the curricular adjustment to meet the needs of the times and therefore provide opportunity to satisfy the inherent desire in every boy to express himself through the media of diverse tools and materials.

The construction and repair of electrical devices invariably involve more than simply a knowledge of electricity. The pupil is required to delve into the activities of related industrial fields. Communication, power and lighting, designing, finishing, construction, metalwork, and cabinetmaking are those most frequently encountered.

The Avocational Function. The great electrical industry has made many notable contributions to our social welfare and industrial progress. Not the least in importance of these is the additional leisure time made available to people because of labor-saving devices and the consequent relief from much of the drudgery in life. Not only is electricity responsible for filling in part of that leisure time with music, song, and timely knowledge brought to the fireside by the radio, but there remains plenty of time for people to pursue physical and mental enjoyment heretofore denied them. The study of electricity offers a channel for the utilization of this excess time in the pursuing of a hobby such as electrical experimentation and construction in the home workshop. Is it unreasonable to assume that the electrical pupil will develop electricity as a hobby? If he should not, the discovery of a line of work that better suits his individual aptitudes and abilities would be a fortunate occurrence indeed. While we're discussing the subject of hobbies, this question arises: How many avocations are there which are more profitable or enjoyable than making necessary home repairs and keeping the household appliances in good working order? Then, too, on how many occasions is the automobile owner required to diagnose ignition troubles, make minor repairs and adjustments, or supervise the garage man when extensive repairs are indicated? Any average junior- or senior-high-school pupil can be taught the elements required in the maintenance jobs mentioned, thus becoming a more useful member of the family and an enterprising citizen.

Consumer Function. In view of the extensive use to which electrical appliances are put — as shown by the data quoted earlier in this article — the schools should provide our youth an opportunity to understand the purchase, maintenance, and use of these products. There seems to be no other method, other than bitter experience — which often proves costly — by which consumers may obtain this knowledge, knowledge which is so essential in the development of a better understanding and appreciation of the individuals engaged in the making of these products.

Social and Cultural Function. Since the product of the electrical worker is a factor in the lives of so many people and is surpassed in importance by few, if any, industries, experience in its operations and a knowledge of its development are broadening influences of considerable worth.

The formation of desirable habits and attitudes, and the attainment of a fuller understanding of himself, all these will aid the student in acquiring ideals of citizenship. In addition to this, the appreciation of honest workmanship; conditions, requirements, and rewards of industry, sanitation, safety, preservation of natural resources, housing, and other topics related to our social order are opportunities of which the pupil may avail himself.

An electrical course such as the one herein described is one which no industrial-arts program can afford to be without. This is particularly true of teacher-training institutions. Circumstances demand that schools of education include it, and satisfy the needs of industrial arts throughout the country. Such a widespread and common, though unexplored, subject as practical electricity deserves to assume the position in progressive education to which it is justly entitled. Inasmuch as woodwork, metalwork, designing, and finishing are to a considerable degree component parts, this type of electrical work lends itself perfectly to the general shop setup of many of our school systems.

The teacher need not be a technician of vast experience in the field. An alert, ambitious, general shop teacher who is willing to apply himself and studiously pursue electrical knowledge through extensive courses can readily adapt his previous experience to the teaching of electricity. But this distressing fact forces itself to the fore: too frequently schools and universities assume an aloof attitude regarding up-to-date practical education. We feel sure the day will come when a full realization of its value will be appreciated. Then it will take its proper place in the curriculum in both secondary and higher educational institutions, along with present-day industrial-arts and academic courses.

Advance electrical shop, Macomber Vocational High School, Toledo, Ohio

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

J. J. Metz, Editor

Some Pertinent Questions

At a breakfast meeting of the Kansas Vocational Association held in November at Wichita, Dr. Ralph H. Woods, then president of the American Vocational Association, voiced six questions which each vocational shop teacher may well ponder. Upon his answers to these questions depend not only his own success, but the entire future of the field of education in which he is engaged.

The first of these asks whether the shop teacher believes in vocational education to such an extent that he is convinced that vocational efficiency is essential to the economic security of the individual, and to the realization of the value of one's work in establishing the stability of the nation.

Every vocational teacher will see how necessary it is for him to have a thorough understanding of the far-reaching influence which he possesses in influencing the lives of the future worker, when he considers that his instruction covers the activity which occupies at least one quarter to one third of the average man's life. Pondering on this question will also help the teacher to get an excellent perspective of his own job.

The next question is equally significant for it asks the teacher whether he believes in broadening the school program so that it meets the needs of all people. It is but a comparatively short span of years ago when vocational education was provided only for those entering the professions. This was, in most cases, furnished at public expense for students coming from families that could well afford to pay for this type of service themselves. Vocational education has been broadened very much since that time. Its proper application, however, is open to much improvement, and every earnest vocational teacher will try to do his part in solving the question of how to make vocational education more efficient in meeting the needs of all the people.

The third question asks the teacher to make the *practical*, the motivating part in his vocational course. This, by no means, infers that technical and related material should be ignored in the teaching of vocational subjects, but it does emphasize that the student who finishes a vocational course, must be able to enter industry equipped in such a manner that he can efficiently do that for which he was trained. He must possess skills as well as knowledge.

The next question is also very important for it asks the teacher whether he does his share in developing in his students proper attitudes toward work, home life, and community life. The past ten years have amply demonstrated to many people how exceedingly valuable it is to be blessed with a job. Unfortunately the depression was prolonged so much that public and private charity and philanthropy were hard pressed to provide the jobless with shelter and the necessities of life. Then federal money started to flow in, and with political patronage and the dishonesty of mankind, the life of the jobless became so enticing that many have lost the concept that a man, to be a real man, must work to support himself and those dependent upon him. Likewise in the past, when parents became unable, for some reason or other, to support themselves and their families, the children, even though they had established families of their own, would contribute to the support of father and mother. Those ideals no longer exist in the minds of many children who come to our schools today. It will be a hard job to influence many of these youngsters, who come from families that have had relief subsistence for years, to get the proper attitudes toward work, and toward home and community life. It is a part of the vocational teacher's job to re-establish these ideals which are so necessary to the maintenance of our democracy.

The question, whether the teacher supports the organizations that work for his welfare and his professional security, needs no elaboration. Without the A.V.A., vocational education would hardly exist except in the larger cities. Everyone who knows the value of vocational education in the proper bringing up of the youth of our land, will realize the necessity of maintraining his membership in the state and national vocational organizations so that vocational education may be developed to the fullest extent.

The final question also is of much importance for it asks the teacher whether he tries to keep his community informed about what he is doing. The secretary of the Chamber of Commerce of Grand Rapids, Mich., is quoted as having told Dr. Woods, while arranging for the last A.V.A. convention at Grand Rapids, "You educators do a poorer job of explaining your program by publicity, than any other group with which we come in contact."

The old saying about the newly invented mousetrap selling itself without the aid of advertising, has been found wanting in these modern days. Big business has found that it pays to advertise and educators, too, will find that their efforts will be much more efficient, and better understood if they do not wait for their communities to find out by chance what the schools are doing. Vocational teachers should, therefore, study to improve their methods of letting the public know what they are offering.

The questions just stated, if properly studied, will assist many vocational teachers to get a helpful perspective view of their own job. They may also aid in shaping vocational education so that it may take its proper place in the educational scheme of America's youth.

Extending Congratulations

Kiwanis International celebrated its twenty-fifth anniversary at Detroit, Mich., during the month of January this year. Under ordinary circumstances these columns might not take cognizance of an occurrence of this kind, but the steady and active interest which the members of this organization, through their local clubs in the United States and Canada, have always shown in the vocational-guidance movement and in the work with the underprivileged children, deserves special recognition by those who are engaged in the fields of practical education.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION and its thousands of readers, therefore, extend congratulations to the members of Kiwanis International in this, the twenty-fifth anniversary year of their organization. It is hoped that Kiwanis will continue to cooperate with the schools in preparing youth for life in this most wonderful, yet most troublesome age.

It is further hoped that the example set by these service clubs will induce other organizations to take like interest in educational efforts. It is only when parents, business, industry, the professions, and the schools, work together that an adequate solution of the educational problem can be realized.

The Quest for Quality

Dean M. Schweickhard

Assistant Superintendent of Schools, Minneapolis, Minnesota

Bases of Judgment

The variety and array of merchandise in a department store give evidence of the widespread human desire for the exercise of free choice. If it were otherwise we should all be automatons, whose needs could be supplied as mechanically as producing nails in a nail mill. Since we do have the desire to choose, and in many instances the opportunity as well, there is forced upon us the necessity of more or less consciously selecting some basis upon which a given choice shall be made.

When it comes to buying clothes, what is the basis of selection? Is it warmth, long wear, texture, proof against wrinkling, appropriateness, or just general appearance? Or perhaps price becomes the chief determining factor. Price is not a quality of the garment, however, but merely a rough measure of the existence of various elements which together make up the total estimate of its quality. When the standard of quality desired has been established then the price one is able or willing to pay determines how closely the purchaser can come to reaching the standard.

Just as individuals differ in the comparative importance attached to the various elements entering into the final estimate of quality, so does a single individual vary from one time to another in his weight of emphasis. Frequently a trivial factor which makes a sudden appeal may blind one to more substantial elements in clothes, shoes, automobiles, houses, or food. Even in judging people, first impressions do not always take into account all the traits which should be considered. The result of hasty choice or mistaken conclusion can be rectified most effectively, not by useless regrets, but by seasoned consideration upon a broader or more widely chosen basis in subsequent situations of similar nature.

Outward Appearance

There is danger in the inference that appearance is always to be discounted or frowned upon as a deceiving element in seeking to discover real quality within. False hair is worn chiefly for appearance but still may cover something of quality. Similarly the quality of what lies underneath cannot always be determined by the paint on houses, cars, bridges, faces, or fingernails. Also clean hands and faces do not always tell us the whole story about the person to whom they are attached. Well-pressed clothes make a better appearance, but the pressing can add nothing to the quality of cloth and workmanship entering into their original construction. Let it be remembered that in human beings and in the things they possess or seek to possess, quality and its desirability are always enhanced by a pleasing or attractive appearance.

In almost all human relationships there is an underlying desire for quality. Friend seeks friend because of a certain quality considered desirable. The pupil when free to do so selects the teacher he believes to possess a high quality of life, knowledge, ability, fairness, or other trait thought of as essential. The employer sets up standards of quality in terms of preparation, experience, honesty, accuracy, speed, and other specifications required in his business. Even the voter casts his vote for the candidate he looks upon as possessing power, influence, statesmanship, or substantial qualifications for the office. The problem involved in each of these situations, however, is to differentiate between that which appears to be and that which is.

The magician is a master at making things appear other than they really are. Onlookers are amused and interested, and try to explain among themselves how the strange feats are accomplished. But most important of all they usually do understand that there is a difference between appearance and actuality. If this lesson could be carried into other phases of human experience, fewer people would be fooled by appearances, and the quality veiled by the appearance would be more readily detected. As in the case of an unpolished diamond, excellent quality may be hidden beneath a rough exterior as completely as an imitation gem may be disguised for a time with an external glitter.

The Craftsman's Spirit

In the days of elder art workmen are said to have wrought with greater care each minute and unseen part because of the belief that the gods see everywhere. This was merely an expression of the conviction that what the gods could see was of greater importance than what could be seen most readily by man. What the gods could see likewise was identical with what the craftsman knew he had woven, builded, or molded into his own work.

This spirit may be scoffed at by the shortsighted industrialist of today; but a little close observation will show that it still exists and must continue to exist in any enterprise that expects to be a lasting one. Flashy articles may sell for the moment, and dashing entertainers may draw the crowds for their day, but the product which stands the test of service is the one which calls for reorders, and the artisan who has become a master is the one who commands the world's respect.

The musician at heart is the one who practices hour upon hour, ever seeking greater quality of accomplishment. The athlete who would excel, trains incessantly and submits to rigid self-discipline in order that he may go as far as possible toward his goal of perfection. The violin maker seeks to find the rare piece of wood with responsive fibers, and to discover the master stroke which will produce an instrument of finer quality than ever before attained. The florist devotes his life to produce a rarer bloom by special care and culture. And the potter counts the expenditure of his strength as naught, and loss of sleep as trivial, if he can but accomplish the quality of glaze which has been his lifelong vision.

Industrial-arts teachers must help students acquire the ability to appraise things for both the obvious as well as for hidden values.

The change from hand processes to machine processes seems to have caused confusion in the minds of some concerning the ever existent demand for quality in human life and service, and in the material things people produce and use. The fact seems to be overlooked that the finer the quality of planning, material, and skill which go into the building of a machine the finer will be the quality of the machine; the finer the quality of the machine the finer can be the quality of its product or the service it performs for mankind; and the more man is relieved from backbreaking drudgery by the service of the machines he has built the more his own efforts may be devoted to seeking higher quality of life and service, if he can but discover how to use them.

The industrial-arts shop has the whole world within its walls. There is raw material waiting to be formed, there are hand tools and machines, there is a wealth of human initiative, ingenuity, and energy. Under the direction of a teacher with vision these component parts can all be made to fit into a unified whole; the teacher's quest for quality of life as well as quality of work in his students can be fulfilled; the pupil's quest for quality in the many ramifications of his school life will be satisfied; and the generation coming into being will pursue an undying quest for a quality of civilization possible only when every man lives, works, and serves in accord with the best that is within him.

Our thoughts are ever forming our characters, and whatever they are most absorbed in will tinge our lives.—*Anonymous.*

When men speak ill of you, live so as nobody may believe them. — *Plato.*

Greensboro Makes a Firm Analysis Survey

Q. E. Mathis

Director Vocational Education, Greensboro, North Carolina

For several years all youth-serving agencies have realized that one of the greatest problems of occupational adjustment is that of young people between the ages of 18 and 25, or more specific, that of recent graduates of high school and college. Each such organization had made some effort to solve this problem. However, it was realized that all groups had the same objective and much valuable time was being lost by the duplication of effort.

With this in mind, the Greensboro Vocational Guidance Committee was organized so that a concentrated effort might be made to help solve this problem. The members of the committee represented a number of clubs, schools, colleges, other youth-serving agencies, and employers. It was found that while all groups were interested in this proper occupational adjustment of young people, the vocational-education department of the city schools and the junior division of the employment service were both in need of more specific knowledge of the training opportunities and the occupational demands of Greensboro.

The committee worked out an analysis sheet, or questionnaire, to be used for this project. It kept in mind the fact that each analysis had to be complete, yet as brief as possible, because the time element had to be considered.

Representative firms were selected for analysis and an itinerary of some four hundred firms was planned.

It was evident that if definite results were to be secured, the analyses would have to be made by personal interview and not by mail. Consequently, capable interviewers were appointed who would give their time and services to the committee.

Definite information was given the interviewers and they were coached in the procedure which they were to follow. Each point of procedure was explained and discussed separately in its consecutive order, and the interviewers were thoroughly coached in the diversified occupations program, the night-school program, and the functions of the employment service. A demonstration interview between two members of the committee, one of whom was an employer, was then given.

Just before the actual interviews started, an explanatory letter was sent to the head of each firm that was to be visited. This was done so that each employer would understand more clearly the nature of the project.

The local Altrusa Club furnished the money to defray the expense of this endeavor.

Local industries were most cooperative and much valuable information was secured.

The completed analyses were filed for future reference. They have been a source of valuable information in securing diversified occupations training opportunities as well as permanent job placements for a number of young people.

Firm Analysis Sheet

A. *General*
1. Name of Firm..... Address..... Telephone.....
2. Products or Service..... Industrial Classification.....
3. Head of Firm.....
4. Person Interviewed.....
5. Employment Manager..... Interviewing Hours .....

B. *Labor Analysis of Firm*
1. Estimated Average Employed..... Maximum Force..... Minimum Force.....
2. Estimated Number Employed: Men (White) 21 Years of Age and Under .....%, Women (White) 21 Years and Under .....%; Men (Negro) 21 Years and Under .....%, Women (Negro) 21 Years and Under .....%
3. Estimated Labor Turnover: Percentage, if possible, or Number New During Year .....% Number .....
4. Busy Seasons Begin..... End .....
5. Is Firm interested in using student trainees from schools: Clerical ..... Other .....
6. Is Firm interested in regular work referrals from schools (Necessary explanation for any item can be entered below): ..... Colleges ..... Employment Service .....
7. Does Firm have training facilities for new workers ..... Describe.....

C. *General Comments:*
.....

Firm Analysis Survey

Procedure and Explanation for Firm Visitors. The following is given for the information and guidance of the interviewers who will make the actual visits to the firms. Each point of procedure will be discussed and interpreted separately in consecutive order and studied carefully by the interviewer in order that at all times he may have it as a reference when doubt arises regarding any point.

Section A — *General*

1. *Name of firm, address of firm, and telephone.* This information is to be entered in full. A check should be made to see if the address in present use by the firm is the same as that given on the firms-to-be-visited cards. Be sure that the final information is correct.

Explicit directions which may assist workers elsewhere.

2. *Products or service and industrial classification.* The products or service is self-explanatory. By *industrial classification* is meant the type of industry. For example, the products of a plant may be cotton cloth but the industrial classification is "Textile." In other words, the products or service is usually a subdivision of a larger industrial classification.

3. *Head of firm and person interviewed.* The head of the firm may or may not be the person interviewed. In most cases it is probably preferable to see the man who actually does the hiring. Occasionally, the head of the firm may also be the *employment manager*. In any case, state the names of the head of the firm and the person interviewed. If both are the same, complete the blanks by repeating name.

4. *Employment manager and interviewing hour.* If the person interviewed is not the employment manager, obtain this information, getting the full name and title of position actually held. (Most employment managers have personnel work as only a part of their duties.) *It is of vital importance that the hours for interviewing applicants be determined as accurately as possible.* If there is no regular schedule for interviews, state at what time of the day an applicant is likely to receive best attention.

Section B — *Labor Analysis of Firm*

1. *Estimated average employed.* This figure should represent an average figure for the average season of the year. Maximum and minimum forces may represent more than one rush season. In that case a statement of such should be made in the space allotted for general comments.

2. *Estimated number employed, 21 years of age and under.* The ideal answer to all the questions under No. 2 would be, of course, expressed in percentage. If the employer is unable to give the ratios in percentage, try to get the actual figures. If it is impossible to get the figures for both white and colored, the figures for the white workers (men and women) subtract from the total average employed will provide the answers for the last two blanks. If the employer cannot give you either percentage or figures, try to find out if the majority of his workers are men or women, white or Negro, very young or mature. If the answers can-

not be fitted into blanks provided for them, the space under *general comments* should be used.

3. *Estimated labor turnover.* The same general procedure as that just described should be used in answering these questions. Obtain, if possible, the percentage of new workers taken on by firm during an average year; if not, get estimated number in actual figures. If these are also unavailable, state under general comments the answer received to this question.

4. *Busy seasons.* In some industries and firms there is more than one busy season. In such cases state the beginning (as accurately as possible) and ending of each busy season.

5. *Is firm interested in using student trainees from schools: clerical and others.* The vocational department of the city schools has a program of vocational training through which students interested in various types of jobs may receive academic credit for working on a part-time basis at a plant or industry which would provide training in the line of work of interest to the student. The amount of pay for this work is nominal, and clerical workers are available in addition to other types. Explain this program briefly to the employer, determine his interest in using these workers, and enter the results as fully as possible. If he shows much interest in this program, be sure to make a special note of it in order that your information may serve as a guide for future visits.

6. *Is firm interested in regular work referrals from schools, colleges, and employment service.* Ascertain if there is any place in the establishment for college-trained boys and girls. Explain that the local colleges and schools are interested in vacation and permanent employment for their students. Make note of facts in general comments.

Employment service. Be sure to point out the fact that workers of all types are available at all times through the employment service. However, the employment service is also anxious to know what the placement possibilities are for young people at all times, since the employment service is ready at anytime to serve the employer free of any cost or obligation to him. A description of the qualifications of the person will bring any desired number of applicants for an interview. Final selection is left to the employer, yet he is saved the trouble of making the preselection. The employment service has registered in their files many workers of all types, clerical, skilled and unskilled workers from which the employment manager may choose new workers whenever the need arises.

7. *Does firm have training facilities for new workers.* Determine what method or methods are used for training new workers. Is there a regular program of training required in the plant itself, or is each worker supervised by foreman or some other experienced worker in the plant? This is an excellent place to inquire about educational entrance requirements, if any. That is, does the employer have any specific requirements such as a high-school education, technical skill or training, or previous experience. Any answers to these questions are extremely valuable and should be carefully explained in the general comments section.

Section C — *General comments*

The use of this space has already been suggested throughout as a space for enlarging on the answers given to the questions in Sections A and B. An additional, and very important use of this section, is as a summarizing place for any pertinent information not included in the questions themselves which may have come out during the interview. This information may concern working conditions, wages, special requirements, attitude of the employer, and the like, and will be of a very real value.

Division of Occupations for Survey

I. *Agriculture:* (1) Dairy farms; (2) nurseries and greenhouses.
II. *Building and construction (private):* (1) commercial structures (includes stores, office buildings, warehouses); (2) residences; (3) miscellaneous.
III. *Manufacturing industries:* (1) chemicals; (2) clay, stone, and glass products; (3) food; (4) iron and steel; (5) leather and leather products; (6) forest products — lumber; (7) printing, publishing and allied industries; (8) textiles and textile products; (*a*) Cotton goods; (*b*) silk and rayon goods; (*c*) knit goods; (*d*) clothing.
IV. *Mechanical services:* (1) automotive services; (2) repair shops.
V. *Commercial services:* (1) Finance group; (2) other commercial services.
VI. *Wholesale distribution:* Wholesale trade group.
VII. *Retail distribution:* (1) goods group; (2) general merchandise group; (3) automotive group; (4) apparel group; (5) furniture and household group; (6) other retail-store group.
VIII. *Personal service.*
IX. *Hotels, restaurants, amusements, etc.*
X. *Transportation.*
XI. *Communication.*

An Industrial-Arts Course in the Making

C. G. Shower

Director of Industrial Arts,
High School,
Lancaster, Ohio

Lancaster's industrial laboratories, now nearing completion, will be equipped to permit sampling of various practices and processes in modern industry. All youth will be obliged to live in this technical age to which it becomes increasingly difficult to adjust. A student upon graduation may not enter industry seeking a livelihood, but nevertheless as a consumer he cannot escape the maze of machines and materials which is his heritage.

Some city school systems are presenting the skills and information to cope with this complex life through broad industrial-arts programs in both the junior and senior high schools. Lancaster does not have a junior high school and for this reason industrial-arts education must of necessity be provided in the four years in the high school. The revised Ohio high-school standards of 1937 place a new emphasis on industrial arts in the public schools. Because of this increased emphasis by the state department of education and a definite interest on the part of citizens of our community in industrial arts, the board of education proceeded to make physical provisions by constructing an addition to our present high-school building. Since the need for the greatest good of the greatest number must always be considered, specific vocational education as such will not be provided now.

Two separate industrial laboratories will be equipped. One laboratory, 23 by 45 ft., will be devoted to industries allied with wood, while another 28 by 58 ft., will be equipped for instruction in several industries allied with metal. A room furnished with armchairs will be provided adjoining this laboratory to be used for discussion and demonstration.

Preparing to give students an insight into industry.

On the second floor a graphic-arts laboratory, 28 by 58 ft., is being equipped to teach industrial drawing in its varied phases, also elementary printing and photography. This room will house the industrial-arts library where reference books, in addition to occupational information and current manufacturer's literature will be filed.

The industrial course as tentatively outlined may be pursued through all four years of high-school life. All ninth-year boys will be encouraged to enroll for at

least the first year's training, but of course this is not required for graduation.

The beginning student will take general industries, one period (45 minutes), under the co-instruction of the two men in charge of the general-industries laboratories. Here *general industrial skills* will be presented and pupils will make small articles of a quite varied nature. The cost of materials will be shared between the board of education, and the student. One-half credit will be granted.

Concurrently the student will take industry and drawing, a course under the instruction of the man in charge of the graphic-arts laboratory. Here *general industrial information* will be presented and pupils will be guided in their choice of an industrial field. A wide variety of industrial drawings will be made with no cost of materials to the pupil. One-half credit will be granted. In these two courses the pupil will meet three instructors to get an *exploratory* contact with industry.

Two similar courses will be offered concurrently in the tenth year. They will be termed industrial arts and graphic arts. These courses will permit of more individual instruction, and as the names imply, more attention will be paid to design elements and construction data. Students will be encouraged to work on projects of individual design and to outline procedures and figure costs. Materials will be paid for by the pupil. One and one-half credits will be granted for two 45-minute periods. These tenth-year courses will be cultural in nature, that is, have general educational value, but will not be prerequisite to the courses in the junior and senior years. However, they are recommended.

The program for the junior and senior years will have vocational aspects. Facilities will be provided whereby students who have ranked "B" or better in all previous industrial-arts courses including industrial mathematics, general science, and commercial geography may elect one or more of the following:

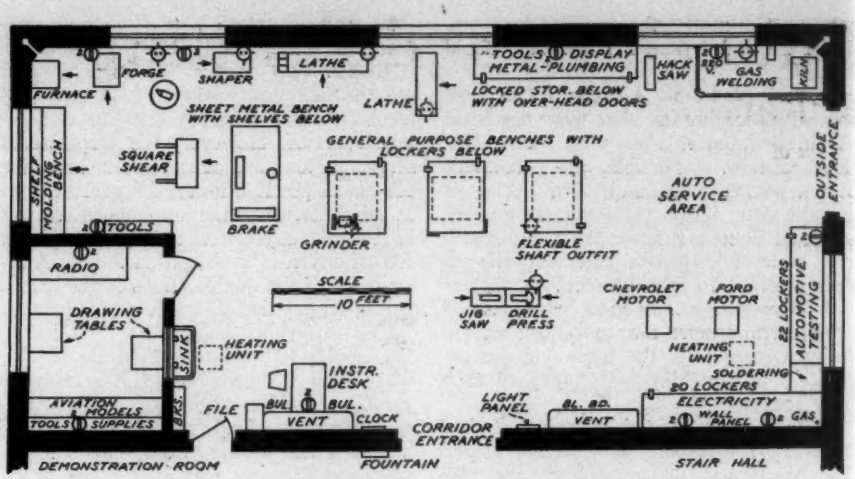
Metalworking	Electricity and Radio
Woodworking	Building Trades
Automotive Essentials	Architectural Drafting
Printing and Commercial Art	Machine Drafting

Materials, in these courses, will be paid for by the student.

One laboratory period with supplementary reports will be granted one credit. One or more courses may be taken concurrently or more than one period may be granted for any one course. These students will be interspersed through every period in the day, and will on occasion be asked to assist the instructor. Foremanship training will be thus encouraged.

The *metalworking* course will provide units in foundry, forging, machine shop, and welding practice, sheet-metal working, and ordinary benchwork in art metal, etc.

The *woodworking* will include pattern-making, furniture making, carpentry practice, wood finishing, and certain phases of home mechanics and crafts. The *home workshop* will be encouraged as a leisure-time activity.



General industries laboratory, Lancaster, Ohio

Automotive essentials will be based on a text of that name and can provide only what the name implies because of limited facilities. However, tools and testing equipment together with motor and transmission units from two popular cars can do much to give the students some insight into the automobile from the viewpoint of the driver and of the worker in the automotive field.

Printing and commercial art will be outlined to teach the various methods of copy reproduction, with practice in hand composition and layout. A platen press will be available. Prints will be made from etchings and engraved blocks. Lithography will be demonstrated. Lettering and type forms will be emphasized.

Electricity and radio will present units in care and repair of household appliances, house wiring, electrical measurements, electroplating, generation of current, storage batteries, motors, ignition, lighting, radio service, telephone, etc. Students will be encouraged to construct and use simple electrical devices.

The *building-trades* course will be centered around typical frame construction, with units on concrete and brick foundations, framing as exemplified by scale models, stair and roof mathematics and practice, material lists and estimating, interior finishing, painting and decorating, wiring, plumbing, heating, and air conditioning, etc.

Architectural drafting will incorporate some of the foregoing elements with major emphasis on materials, design, and drawing. Planning and developing a home from inception to completion will be the central theme of this course. Display drawings, working drawings, and models will be prepared. Public buildings will also be touched upon.

The course in *machine drafting* will be designed to lend vocational guidance for entrance into the manufacturing industries and engineering. The *language of industry* will be taught in its manifold forms. Simple shop working drawings will be prepared. Sectional representations, auxiliary views, symbols, conventions, mechanism, bolts, nuts, screw threads, gears, etc., will be presented. This course will be closely correlated with metalworking.

In all the foregoing courses, opportunity will be provided for observation and cooperation with the field concerned. Student interest and personality will be respected. All work in the laboratories will be supplemented by directed planning, and reports prepared outside class time.

Three extracurricular clubs will be formed as follows:

1. Crafts club open to 8th-grade boys only.
2. Industrial-arts club open to high-school students and adults.
3. Graphic-arts club open to high-school students and adults.

All three clubs will meet the same evening with all three instructors present.

As previously implied, a new course called mathematics for shop and drawing students has been introduced. The present general mathematics of the freshman year will be followed by the new industrial mathematics under the same teacher. Physics will be recommended to those students who enroll in the industrial course. Algebra will be recommended to the better students.

The present program is in charge of C. G. Shower, instructor in the drafting room and planning laboratory and A. R. Peer, instructor in the wood shop. Robert O. Davis will be in charge of the industries allied with metal.

This industrial course was prepared in cooperation with Supt. Curtis L. Berry; Principal Paul Wenger; A. R. Peer, shop instructor; Howard Hileman, board member; and Dr. William E. Warner, adviser, representing the state department of education.

The term *laboratory* used herein implies that the instruction is carried forward on an experimental and developmental basis, rather than a production one.

Publishing and Printing

R. Randolph Karch

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Rochester Athenaeum and Mechanics Institute,
Rochester, New York

(Continued from page 127, March, 1940, Industrial Arts and Vocational Education)

MAGAZINE PUBLISHING

Introduction. As in the case of the newspaper publishing organizations, the magazine or periodical staffs are not standardized in their workers, or in the duties of the workers, whatever title they hold.

It is claimed that most difficulties in magazine production lie in relations with printers. In most cases, the majority will agree, the fault lies with the fact that the editor and his associates are ignorant of printing processes, and the printer's needs and problems. Cases have been reported where authors — and editors — have required 100-per-cent resetting of an article or story. Ridiculous alterations such as this result in overtime, extra speed, and high cost in making deadlines.

Periodicals[2]

	Number	*Circulation*
Weeklies	966	42,648,210
Semi-Monthlies	171	5,507,919
Monthlies	2,009	102,193,740
Quarterlies	510	23,277,089
Other Classes	133	2,160,680
Totals	3,789	175,787,638

Other than the owners, or corporation, the workers on a magazine may be classified as follows:

1. *Publisher.* Publishers are divided into two types: those who are in business for the money to be made, and those who act as an "angel" for a publication for the fun of it, or to keep going what they call a "good cause."

2. *Editor.* The editor is the most important staff member. The success or failure of the magazine rests in his hands. First of all, he must understand the printer's work, and what they can and cannot do. He must know what the public wants even before they know it themselves. He must sense when and how the public changes its mind. Discovery of and contact with writers and authors is an important part of the work. The editor must direct few or many assistants to do routine work; depending upon the size of the magazine. He must know how to present material so that people will want to read it. Prerequisites for the job would include a very liberal education, wide general interests, and great ability to do literary and editorial work.

3. *Managing Editor.* The managing editor is next in line to the editor. He handles publicity for the magazine, helps the editor to find authors and artists, and works with them. He makes sure that the magazine reaches the newsstands on time. He handles office routine. He is one who understands printing production in all its phases, because he must work with the printer in handling proofs, make-up, and such work.

4. *Literary Editor.* The literary editor usually writes the book-review section, and selects fiction, short stories, essays, poems, and novels.

5. *Art Editor.* One would think from this title that the art editor must be an efficient artist, in the accepted meaning of the word. This is not generally true. He interviews and works with artists, photographers, and directs the making of engravings and color plates.

6. *Business Manager.* The business manager has charge of payment of bills, purchases other than editorial material, and may have circulation duties.

7. *Circulation Manager.* A great deal of responsibility rests on the shoulders of the circulation manager, for in his hands is the job of keeping old subscribers and getting new ones. He has charge of all advertising for the magazine which helps to secure readers. In this respect he plans advertisements and circulars, and directs the work of canvassers, and does promotion work generally.

8. *Advertising Manager.* One of the important jobs on the magazine staff is that of the advertising manager. Under his direction work the salesmen and representatives in various cities of the country. Most of the advertising is placed through the hands of advertising agencies. Business houses, after appropriating certain monies for advertising, place the account in the care of agencies, who assume the responsibility for advertising the goods manufactured. The planning, copywriting, illustrating, and layout are planned well in advance, and sent to magazines which will give good coverage of every possible purchaser in the country. The agencies select the magazines in which the advertisements are to run.

9. *Printers* should carefully consider the taking on of any magazine just beginning. Some printers, in seeking a regular printing job, and volume of business, take on magazines which eventually die, taking some of the printer's money with them. Sydney Cooke, writing in the magazine *Printing*[3] states: "A publication must have an editorial objective. If it is a trade journal, it must have a mission and a purpose. . . . Printer will admit . . . that a publication must have a specific editorial objective, yet he will be the first to advance credit to launch a publication which has no justification for its existence. Why? The answer is the frantic desire of printers for volume. The printing industry must remember, that the more it sponsors publications of the unwanted type, the more difficulties it is offering for time-tested publications to draw in the required advertising revenue, and generally speaking, the printing accounts it already has."

BOOK PUBLISHING

Introduction. The business or profession of book publishing can be likened to no other work in the putting of ink on paper — in fact, not to any other business or profession. This is so because there is no set procedure or formula for securing "best sellers" — that is, books which will make fortunes for both the publisher and the author. There is no way to tell, in advance, how many books of a given edition will be sold. There is instability in profits for the above reasons.

The publishing center seems to be located on Manhattan Island, in New York City, and Boston, Mass. There are approximately 243 general publishers. Some publishers are far larger than others, as twelve of the 243 operating in 1938 issued more than 35 per cent of the titles.

1. *Book Sales.* The general public hears much about the best sellers in publishing; very little about the many books which lose money for the backers. The *Tarzan* books of Edgar Rice Burroughs, in fifty-six languages and dialects, have sold over twenty-five million copies. *Anthony Adverse* and *How to Win Friends and Influence People* have sold over a million copies each. These books were published by Farrar & Rinehart and Simon & Schuster, respectively. Macmillan's *Gone With the Wind* has sold 1,750,000 copies. But it should be remembered that from 1875 to 1933 only twenty books have sold over a million copies, according to *Fortune* magazine.

According to Frank E. Fehlman, writing in the *Editor and Publisher*,[4] 60 to 90 per cent of book buyers are women, and that these sales consist of novels, poetry, travel, and biographies. Best sellers become that way, he states, not because of any advertising on the part of the publisher, but because certain books are recommended by book clerks over the counter. Then, by word of mouth, the "advertising" gets around.

The first novels of most authors seldom sell over 1,500 copies, thus losing money for the publishers. In fact, most authors rarely get more than $500 for each manuscript, and there exist no more than a dozen authors who make riches from published novels. A run of 100,000 novels is phenomenal, and a run of a million is looked upon as a miracle.

Publishers who issued a total of 2,892

[2] Figures are for the year 1935, *World Almanac*, 1939.

[3] *Printing*, August, 1939, p. 25.

[4] *Editor and Publisher*, August 12, 1939, p. 25.

titles, and the number they published in 1938 are listed as follows:[5]

Macmillan	574
Grossett & Dunlap	363
Oxford University Press	321
Harpers	254
Longmans, Green	223
McGraw-Hill	196
Doubleday	185
Dutton	182
Scribner	161
Lippincott	149
Appleton	148
Blue Ribbon	136

The total output of 243 publishers operating in 1938 consisted of 8,225 titles. In 1927, 238 issued 8,499 books; in 1936, 241 publishers got out 261 books. The year 1938 was marked for having the largest number of publishers for the ten years preceding.

An interesting table of book production from 1902 to 1937 is given herewith. For classification into books on religion, philosophy, etc., see the latest *World Almanac*.

Book Production Growth

Year	*New Books*	*New Editions*	*Totals*
1902	5,485	2,348	7,833
1912	10,135	768	10,903
1922	5,998	865	6,863
1932	7,556	1,479	9,035
1937	9,273	1,639	10,912

In considering the average novel, which sells for $2.50 in bookstores, and has a first printing of 2,500 copies, it can be broken down into the following production and selling figures, quoted from two magazines:

	Fortune[6]	*Time*[6]
Bookseller	$1.00	$1.0325
Author	.25	.32
Advertising	.22	.17
Overhead	.50	.39
Manufacturing cost	.50	.52
Publisher's profit	.03	.0675

From the foregoing figures, we can see if the edition is popular and sells out, the author makes only about $600, and the publisher makes only about $75. But, if the edition does not meet with sufficient public approval to sell out, the publisher may lose as much as $1,000 and the author may make almost nothing for his task of writing about one hundred thousand words.

Should the edition be reprinted, having justified the work being placed on the presses again, the profits are raised tremendously — because the type composition and electrotype plates have already been paid for. In some cases, the publisher may take in $50,000, and the author up to $25,000 in royalties.

According to *Time*[7] the sale of cheap reprints, selling from 39 cents to $2.49, distributed ten million copies in one year. Grossett & Dunlap and Garden City sold about three million each in a year. Fully ten million more are sold by National Home Library's "Jacket Library" (15 and 25 cents), Haldeman-Julius' "Little Blue Books" (five cents), and Whitman Publishing Company's ten-cent-store books. Original editions, however, cannot be sold with profit for less than $2.50.

2. *Contracts.* In agreements between publisher and author, the author grants the publisher the exclusive right to print and publish, and to sell in all countries. The publisher bears the whole expense and risk of the printing, binding, sale, and composition (except the cost of author's alterations in excess of from 5 per cent to 15 per cent of the cost of the composition. This charge, if made, is deducted from the royalty payments made to the author). Now and then a publisher will expect the author to "guarantee" the sale of from 500 to 1,000 copies, thus "spreading" the risk. It is the opinion of this writer that such a procedure is not wise for any author to take. Almost anyone can "publish" any work, no matter how bad it may be, provided he guarantees enough copy sales so that the publisher makes money. Clauses are written in contracts indemnifying the publisher against all claims, actions, damages, and costs of any infringement of the copyright law, or any libelous or scandalous matter.

3. *Royalties.* Novelists usually do business through agents, who make about 10 per cent of the royalty earnings. Royalties are usually paid on the following basis:

10 per cent	First 5,000 Copies Sold
12.5 per cent	Second 5,000 Copies Sold
15 per cent	All Copies Sold Over 10,000

Over 193 million books, and over 220 million pamphlets were manufactured in the United States during 1937, according to the Census of Manufactures. These figures show a steady rise from 1931. Textbooks represent 38 per cent of the total.

Books and Pamphlets Published in 1937

Dollar value of products and receipts for books and pamphlets printed and published or published only, $168,256,861.

	Number of Copies[8]
Books, total	193,343,560
Agriculture and related subjects	1,034,607
Bibles and testaments	1,562,801
Biography	2,754,390
Fiction	25,454,135
Fine arts	694,163
History	1,238,806
Juvenile	29,336,530
Law	2,448,165
Medicine	3,923,532
Poetry and drama	1,788,541
Religion and philosophy	6,944,102
Science and technology	2,380,531
Sociology and economics	1,156,885
Textbooks for school use	72,771,685
Travel and geography	1,641,931
Music (musical reference)	6,722,598
Reference	3,841,442
Miscellaneous	23,367,371
Bluebooks, directories, catalogs, etc.	4,280,525
Not reported by class	4,280,525
Pamphlets, total	220,864,277
Juvenile	13,528,811
Texts for school use	57,004,998
All other	150,330,468

4. *Book Publishing Organizations.* According to one publisher, the job of publishing calls for more diversified training than any other industry. "The routine," he says, "is something like this: You have to think of likely books the world may be waiting for; you have to find the right man to write it; you have to nurse him along to complete his task; then you have to pretty well rewrite the thing; then you have to manufacture it; then you have to sell it; and then, of course, you have your warehousing problems, and the ordinary office routine, and, often as not, a 'bust.'"

In the organization of the workers in a book publishing house, as in other publishing houses, the duties are so distinctive that very few assistants in one department can undertake the duties of another department. All workers are specialists in their fields. Also, as in other types of publishing and printing houses, no two organizations are alike. A typical organization, however, is as follows:

5. *Manager.* The manager is top man in the house, and sees that work is correlated. He knows the duties of most of his help, as he perhaps has risen from the ranks to his high ranking position. He leads the others, takes responsibility when others are not competent to do so. He usually has one or more assistants, to aid with initiation and policy, and attends meetings with the

6. *Editors,* who read, edit, and generally oversee the work of the authors. The editors have the responsibility of seeing that the manuscripts are correct for the printer, and may aid materially in the selection or rejection of any writer's work. They also act on proofreading, and aid in production.

7. *Production Managers* have many duties, the most important of which follow: prepare estimates of costs, purchase composition, electrotypes, engravings, paper, art work, photoengravings, presswork, dies, and binding work. They supervise proofreading and indexing, and watch over the inventory. The usual procedure in manufacturing a book is to furnish the printer with the manuscript, from which he sets sample pages. From these, all estimates are drawn up for the size, number of pages, and probable cost of the book. See the *Fifth Production Yearbook*[9] for detailed data on book manufacturing.

8. *Sales Managers* have charge of traveling salesmen and service, and the library and trade counters. They advise on printing, binding, and price fixing, as well as handle publicity for newspapers, mail and various inquiries.

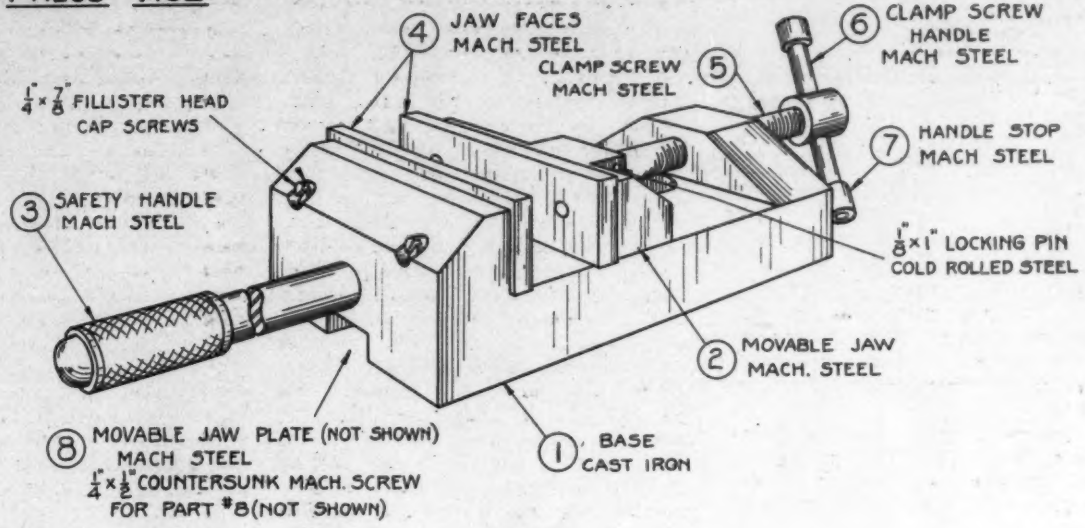
9. *Other Staff Members* include the accountants, who keep books and statistics, bookkeepers, stenographers, secretaries, warehouse managers, shipping clerks, etc.

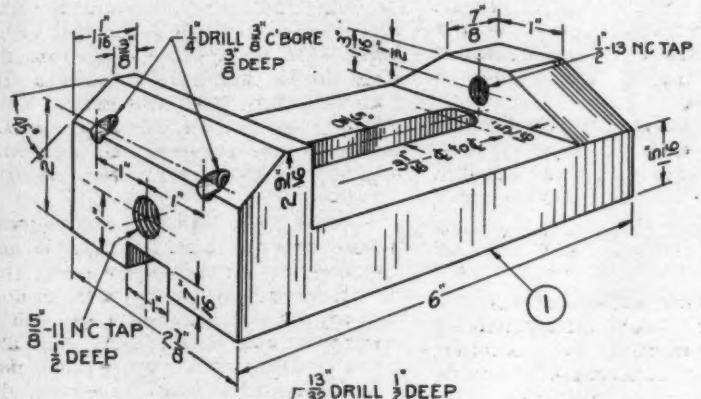
[5] *Fortune*, July, 1939, p. 200.
[6] *Time*, July 10, 1939, pp. 63, 66.
[7] *Publishers Weekly*, January 21, 1939, pp. 204, 205.
[8] *Bookbinding and Book Production*, September, 1939, p. 76.
[9] *Fifth Production Yearbook*, Colton Press, New York, 1939, pp. 43–86.

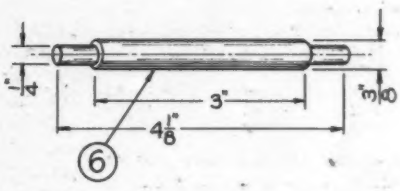
(To be continued.)

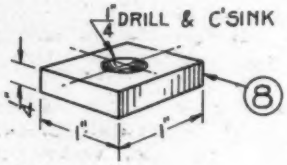
Replacing the best with something better — that is the keynote of progress. — *Edward A. Filene.*

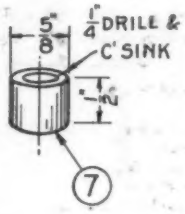
DRILL PRESS VISE

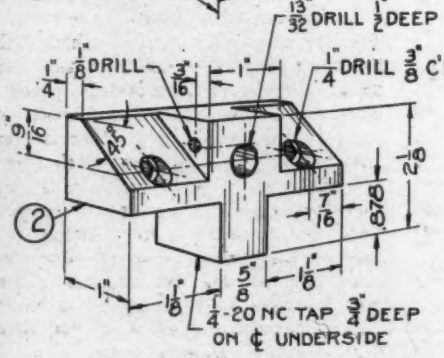

4 JAW FACES MACH. STEEL
CLAMP SCREW MACH STEEL
5
6 CLAMP SCREW HANDLE MACH STEEL
1/4 x 7/8 FILLISTER HEAD CAP SCREWS
7 HANDLE STOP MACH STEEL
3 SAFETY HANDLE MACH STEEL
1/8 x 1" LOCKING PIN COLD ROLLED STEEL
2 MOVABLE JAW MACH. STEEL
8 MOVABLE JAW PLATE (NOT SHOWN) MACH STEEL
1/4 x 1/2" COUNTERSUNK MACH. SCREW FOR PART #8 (NOT SHOWN)
1 BASE CAST IRON

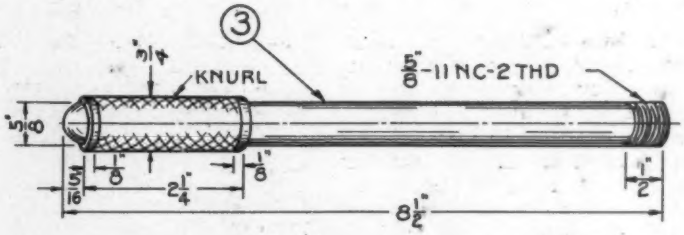


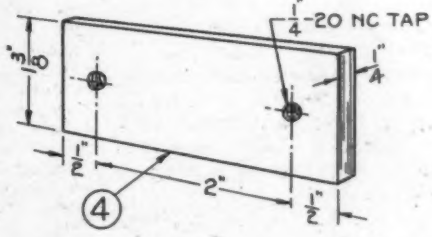


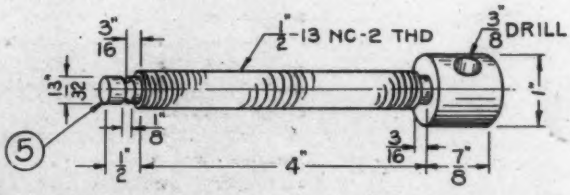










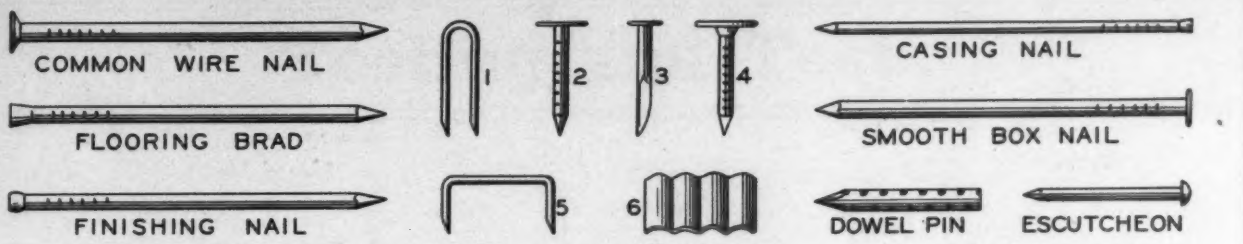


INSTRUCTIONS

USE A 15"x 22" SHEET OF PAPER. DRAW STANDARD MARGIN LINES AND TITLE PLATE. PLACE PART LIST AND STOCK LIST ABOVE THE TITLE. NUMBER FROM THE BOTTOM UP. GIVE PART NUMBER, NAME, MATERIAL AND NO. REQUIRED. MAKE A DETAIL DRAWING OF EACH NUMBERED PART AND A ONE VIEW ASSEMBLY (SIDE VIEW ONLY) SHOWING ALL PARTS NUMBERED IN SAME MANNER AS IN STOCK LIST. HAVE COMPLETED DRAWING CHECKED, THEN TRACE ON VELLUM

TIME ALLOWANCE — PENCIL DRAWING 6½ HRS. — TRACING 4 HRS.

Submitted by W. A. DeVette, Erie Technical High School, Erie, Pa.



1 STAPLE,- 2 PLASTER BD. NAIL,- 3 CUT TACK,- 4 ROOFING NAIL,- 5 HOOP STAPLE,- 6 CORRUGATED FASTENER

COMMON WIRE NAILS

SIZE	LENGTH	GAUGE	DIA. IN INCHES ACTUAL	DIA. IN INCHES APPROX.	APPROX. NO. TO ONE LB.
2d	1 in.	No. 15	0.0720	5/64	876
3d	1¼	14	0.0800	5/64	568
4d	1½	12½	0.0985	3/32	316
5d	1¾	12½	0.0985	3/32	271
6d	2	11½	0.1130	7/64	181
7d	2¼	11½	0.1130	7/64	161
8d	2½	10¼	0.1313	1/8	106
9d	2¾	10¼	0.1313	1/8	96
10d	3 in.	No. 9	0.1483	5/32	69
12d	3¼	9	0.1483	5/32	63
16d	3½	8	0.1620	5/32	49
20d	4	6	0.1920	3/16	31
30d	4½	5	0.2070	13/64	24
40d	5	4	0.2253	7/32	18
50d	5½	3	0.2437	1/4	14
60d	6	2	0.2625	17/64	11

FLOORING BRADS

6d	2 in.	No. 11	0.1205	1/8	157
7d	2¼	11	0.1205	1/8	139
8d	2½	10	0.1350	9/64	99
9d	2¾	10	0.1350	9/64	90
10d	3 in.	No. 9	0.1483	5/32	69
12d	3¼	8	0.1620	5/32	54
16d	3½	7	0.1770	11/64	43
20d	4	6	0.1920	3/16	31

FINISHING NAILS

2d	1 in.	No. 16½	0.0582	1/16	1351
3d	1¼	15½	0.0672	1/16	807
4d	1½	15	0.0720	5/64	584
5d	1¾	15	0.0720	5/64	500
6d	2	13	0.0915	3/32	309
7d	2¼	13	0.0915	3/32	238
8d	2½ in.	No. 12½	0.0985	3/32	189
9d	2¾	12½	0.0985	3/32	172
10d	3	11½	0.1130	7/64	121
12d	3¼	11½	0.1130	7/64	113
16d	3½	11	0.1205	1/8	90
20d	4	10	0.1350	9/64	62

CASING NAILS, SMOOTH AND BARBED BOX NAILS

2d	1 in.	No. 15½	0.0672	1/16	1010
3d	1¼	14½	0.0760	5/64	635
4d	1½	14	0.0800	5/64	473
5d	1¾	14	0.0800	5/64	406
6d	2	12½	0.0985	3/32	236
7d	2¼	12½	0.0985	3/32	210
8d	2½	11½	0.1130	7/64	145
9d	2¾ in.	No. 11½	0.1130	7/64	132
10d	3	10½	0.1277	1/8	94
12d	3¼	10½	0.1277	1/8	88
16d	3½	10	0.1350	9/64	71
20d	4	9	0.1483	5/32	52
30d	4½	9	0.1483	5/32	46
40d	5	8	0.1620	5/32	35

ESCUTCHEON PINS

LENGTH	GAUGE NO.	LENGTH	GAUGE NO.
3/16	14 to 20	7/8	10 to 20
1/4	14 to 20	1	10 to 20
3/8	10 to 20	1-1/4	10 to 20
1/2	10 to 20	1-1/2	10 to 18
5/8	10 to 20	1-3/4	10 to 18
3/4	10 to 20	2	10 to 18

Meaning of Penny

The word penny is an old trade name used to denote the sizes of nails. It is indicated by the letter d placed after the numerals, as for example, 2d, 3d, 10d, etc., and is read, two penny, three penny, ten penny, etc. It also meant that one thousand two-penny nails weighed two pounds, one thousand three-penny nails weighed three pounds, one thousand ten-penny nails weighed ten pounds, etc. These sizes, however, do not accurately indicate the weight of nails in use today.

CUT TACKS

NO.	LENGTH	NO.	LENGTH
1	3/16	10	5/8
1-1/2	7/32	12	11/16
2	1/4	14	3/4
2-1/2	5/16	16	13/16
3	3/8	18	7/8
4	7/16	20	15/16
6	1/2	22	1
8	9/16	24	1-1/8

Testing and Tests

A RATING SCALE

John M. Norton,
Township High School,
Collinsville, Illinois

An attempt to make grading a more logical and helpful method of getting a true personality picture of the student.

The grading of a boy in any class is still a difficult problem for the teacher since we have been unable to break away from the system of giving out grades every six weeks. In our school we have three passing grades A, B, and C. Since giving a pupil a grade is mostly a matter of judgment, a good rating scale seems a logical solution to the grading problem. Too often the projects become the most important product of the shop, but the boys should be our first consideration. Most boys think their projects are the all-important things they get out of a shop course, while others think that passing the semester examination is the true measure of their shop achievements. Both suppositions are false. Even standardized tests are not always reliable, and those produced by the average teacher most likely are not any better in this respect. In any case, a collection of facts does not make an educated man.

The rating scale, shown herewith, takes into account the project, tests, and a good deal more. It rates the boy who is the end product of the shop.

The writer thinks that the items on the accompanying rate scale are in order of their importance with the exception of interest. He has not been able to decide where interest should be placed. Sometimes it seems as though it were the most important; at any rate it should not be last.

This rating scale has been used the past few years. It has been revised twice and of course can be modified to suit the school in which it is used. Each item is discussed and explained in detail in every class at the beginning of the school year. The same scale is used in all the woodworking classes. The boys seem to like to use the scale. They like to grade themselves and are usually very accurate. Sometimes a boy feels he doesn't receive the grade he deserves, usually wanting a higher rating. If he is willing, the class rates him by the rating scale. They learn to use it and understand how the class is ranked.

In some classes a boy is found who does not know what the teacher is trying to teach, and sometimes the teacher himself isn't at all sure. But after the student understands how he is graded, he usually has little difficulty in seeing what his teacher wants to accomplish. Then he works toward the same goals and very often is successful in attaining them.

A RATING SCALE FOR THE INDUSTRIAL-ARTS SHOP

Student..... Rating made by.....

	A	B	C	D
KNOWLEDGE ACQUIRED AND APPLIED	Expresses his thoughts, applies knowledge. Presents new ideas clearly and accurately.	Few ideas not already presented in class.	Not always certain of the work. No ideas	Little knowledge gained. No application of knowledge.
ATTITUDE	Knows best what is expected of him, work progresses smoothly. Takes pride in his work	Not always sure of his privileges. Asks help.	Sometimes disorderly. Needs supervision.	Disorderly and wastes time.
QUALITY OF WORK (ALSO TECHNIQUE)	Workmanship of the highest order.	Good workmanship.	Fair workmanship. Slow.	Poor workmanship.
QUANTITY OF WORK (SPEED)	Rapid worker.	Medium-fast worker.	Slow.	Lazy, indifferent.
IDEALS	Strives to do more nearly perfect work.	Accepts only good work. Knows good work.	Not particularly discerning. Often turns in poor work.	Does not know good work and does not care.
EFFORT PUT FORTH	Accepts only best work. Discards poor work.	Accepts good work only. Tries to do well.	Turns in inferior work and minimum number of projects.	Turns in inferior work. Does not complete project.
ATTENDANCE	Misses very few days. Makes up work.	Absent sometimes. Makes up most of the work.	Absent frequently. Does not make up much of the work.	Absent a lot and does not make up work.
INTEREST	Shows feeling of excitement accompanied by special attention in every new project.	Attentive as his interest is aroused.	Attention must be demanded by teacher. Interest wanders.	Cannot keep mind on work being done.

At the Collinsville Township High School each boy is rated by drawing a line around the statements that, in the teacher's judgment, apply to him. Freshmen are given a rating scale marked by the instructor each six weeks of the first semester. After that he must ask for a rating scale if he wishes to check on his progress. Of course he gets his regular report card each six weeks, and a rating scale is posted on the bulletin board for reference. When a boy receives a failing grade he always receives a marked rating scale from the instructor so that he knows where he failed. This factor alone is worth considerable because it removes friction between the teacher and the pupil who most needs his teacher's help.

A TRUE-FALSE TEST IN MECHANICAL DRAWING

Robert M. Whiting,
New Bedford High School,
New Bedford, Massachusetts

A test that may be found helpful in the drawing room.

In order to help the students keep the facts learned in mechanical drawing fresh in mind, a factual review, or quiz, is important. Occurring periodically it both shows the student what information he has definitely gained and also how much he has not gained.

The true-false type of test is efficient for a periodic checkup, or review, for several reasons. It allows the student to use his judgment according to the reasoning ability gained through his study of the subject; it may be handled more or less expediently in a classroom period; and is easy to check, both from the angle of the student and of the teacher.

In past use of this type of test in my classroom, much interesting and worthwhile discussion has arisen as a result of the questions, thus proving that this type of test has stimulated the students' thinking.

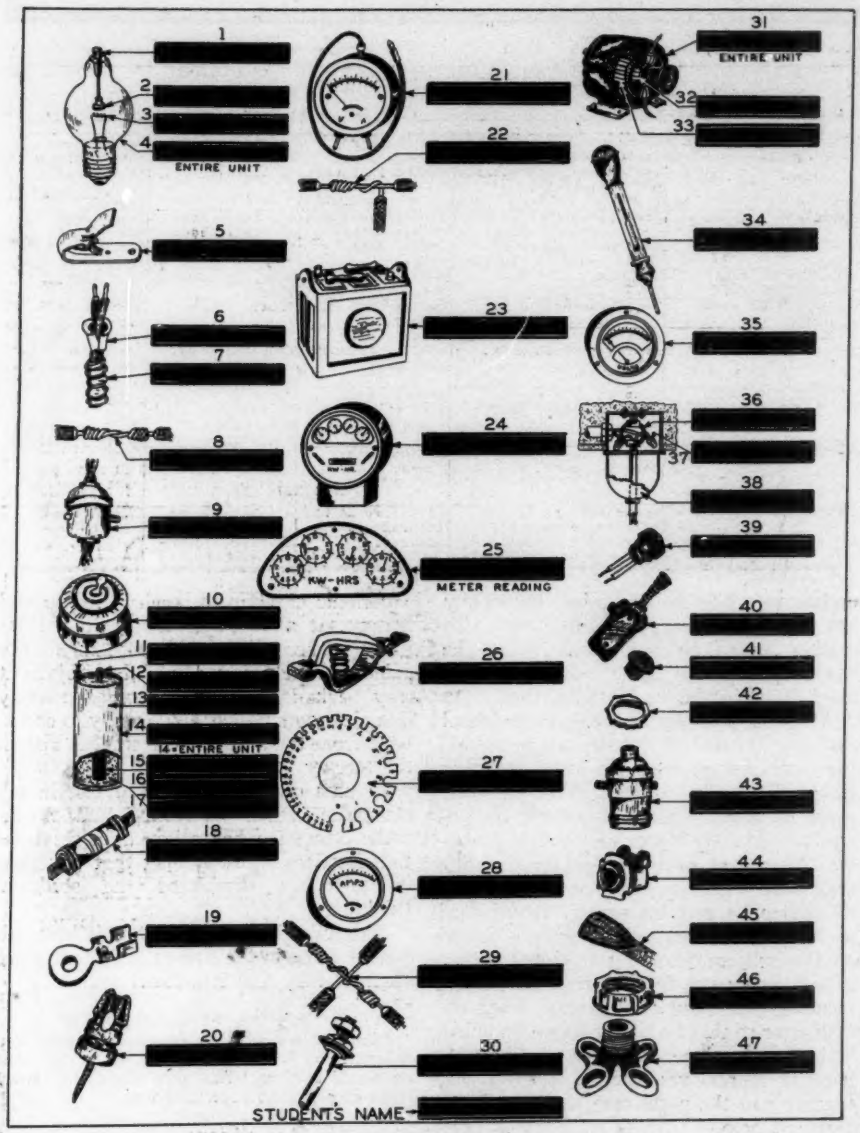
The following true-false test is herewith passed along in the sincere hope that other teachers may find it useful.

Mechanical-Drawing Examination

Directions: Read your question carefully and thoughtfully before attempting to make your answer. Make sure! And then check the correct space according to your reasoning.

	T	F	
1.	...	...	An orthographic drawing shows a picture of the object.
2.	...	...	An orthographic drawing contains three views.
3.	...	...	The arrangement of a drawing should always be planned lightly on the paper.
4.	...	...	A neat, careful layout will reasonably assure an accurate drawing.
5.	...	...	The cabinet system is a system of keeping drawings.
6.	...	...	Definite measurements are not necessary.
7.	...	...	The scale may be used as a straightedge.
8.	...	...	A sharp pencil is not necessary.
9.	...	...	You should clean your implements before commencing work.
10.	...	...	In mechanical drawing, somewhere near, or approximate, applies to all work.
11.	...	...	Isometrics is a system of measuring.
12.	...	...	Lines at an angle of 45 deg. characterize the isometric type of work.
13.	...	...	The head of the T square may be placed anywhere on the board.

14. ... ... Oblique is a name given to both horizontal and vertical lines.
15. ... ... True measure is always made in an isometric drawing.
16. ... ... In cabinet drawings all oblique measurements are made 2/3 actual size.
17. ... ... These oblique lines are drawn at an angle of 45 deg.
18. ... ... A pictorial drawing is always a working drawing.
19. ... ... Quality of line is essential to a good drawing.
20. ... ... A 4H lead pencil is a soft lead pencil.
21. ... ... Dimensions are taken by setting the dividers on the scale.
22. ... ... Never put spring instruments away without opening to relieve the spring.
23. ... ... Lift thumbtacks with the triangles.
24. ... ... Good lettering, well formed and spaced, is necessary for a good drawing.
25. ... ... The lettering type we use is upright Arabic.
26. ... ... Slant lines are oblique lines.
27. ... ... Starting a new paper you commence by drawing the views right away.
28. ... ... There is only one type of center line.
29. ... ... The ability to concentrate is essential to success.
30. ... ... Speed is not as important as accuracy.
31. ... ... Extension lines are necessary in dimensioning a drawing.
32. ... ... Everyone finds *some* use for mechanical drawing in some form.
33. ... ... A center line is a dotted line.
34. ... ... A 3-in. radius means the circle is 3 in. across the center.
35. ... ... One must study all views of an object to gain a complete understanding of it.
36. ... ... The proportions of an object are its relative sizes.
37. ... ... Industry makes big demands upon the draftsman.
38. ... ... Isometric drawings are commonly used because they are easy to read.
39. ... ... A cylindrical form is a round form.
40. ... ... An orthographic drawing has but one view.
41. ... ... Projection and extension lines are the same.
42. ... ... The draftsman must acquire the ability to letter neatly and rapidly.
43. ... ... The power to visualize, or mentally see, the object one is drawing should be acquired.
44. ... ... The serious beginner must obtain a working knowledge of his instruments, the drawing systems, conventional symbols and standards.
45. ... ... *All* lines in a drawing should first be drawn lightly.
46. ... ... A compass should be tipped slightly in the line of direction and turned clockwise.
47. ... ... The compass should be held by the knurled knob on the top.
48. ... ... Compass leads should be sharpened slantwise toward the needle point.
49. ... ... Always handle borrowed instruments and equipments as though they were your own.
50. ... ... "My very best effort always," is a good motto to follow.



Electricity Test No. 2
Clifford L. Yard, Junior-Senior High School, Hastings-on-Hudson, N. Y.

KEY TO ELECTRICITY TEST NO. 2
Clifford L. Yard

1. Negative terminal or cap
2. Anode
3. Cathode
4. Rectifying tube
5. Fahenstock clip
6. Anti-short bushing
7. Armored or "BX" cable
8. Western Union splice
9. Feed-through switch
10. Toggle switch
11. Negative terminal
12. Positive terminal
13. Zinc can
14. Dry cell
15. Carbon
16. Ground carbon, manganese peroxide
17. Sal ammoniac, and zinc chloride
18. Lug cartridge fuse
19. Wire terminal
20. Screw-point insulator
21. Volt-ammeter
22. Tap or branch splice
23. Storage battery
24. Kilowatt-hour meter or watt meter
25. 770 kilowatt hours
26. Battery clip
27. Wire gauge
28. Ammeter
29. Double tap or branch splice
30. Repair terminal
31. Motor or generator
32. Armature or rotor
33. Commutator
34. Hydrometer
35. Voltmeter
36. Hickey
37. Solderless connector
38. Canopy
39. Canopy switch
40. Appliance connector
41. Socket bushing
42. Lock nut
43. Push-button socket
44. Box connector
45. Loom
46. Bushing
47. Hickey stud fixture

Jobs are not born — they are made; and making them costs money. How much? . . . To set up just an average job at the Ford Motor Co. plant costs $9,006.92. A recent survey showed that, when costs were divided by the number of men employed, the results were as follows: For each employee at work, $2,008.55 is needed for land and buildings; $2,670.59 for machinery; $664.78 for raw materials and manufactured goods on which man and machine work; $3,663 for taxes, tools, power, maintenance, wages, and other items necessary to keep the job going. All this must be provided first and paid for, in cash, before manufacturing can even begin. — *Ford Home Almanac and Facts Book, 1939.*

Problems and Projects

DRILL-PRESS VISE

W. A. DeVette,
Technical High School,
Erie, Pennsylvania

(For assembly sheet see page 157)

This problem serves a good purpose in early stages of the first-year work for a drafting-trade student, the second-semester drafting as related work for machinists, and in the upper grades of industrial-arts drafting. It has added value in that it may also be used as a machine-shop project even where castings are difficult to obtain.

The drafting teacher will readily see the many principles and terms that may be presented to students under conditions they will appreciate and understand.

The relation of the various parts to each other, as shown in the perspective, makes the problems more interesting to draw. It makes the "why" of things simpler to understand.

In schools where the vise is to be made in the shop, the machine-shop teacher should have the project drawn up as working drawings for his students to work from.

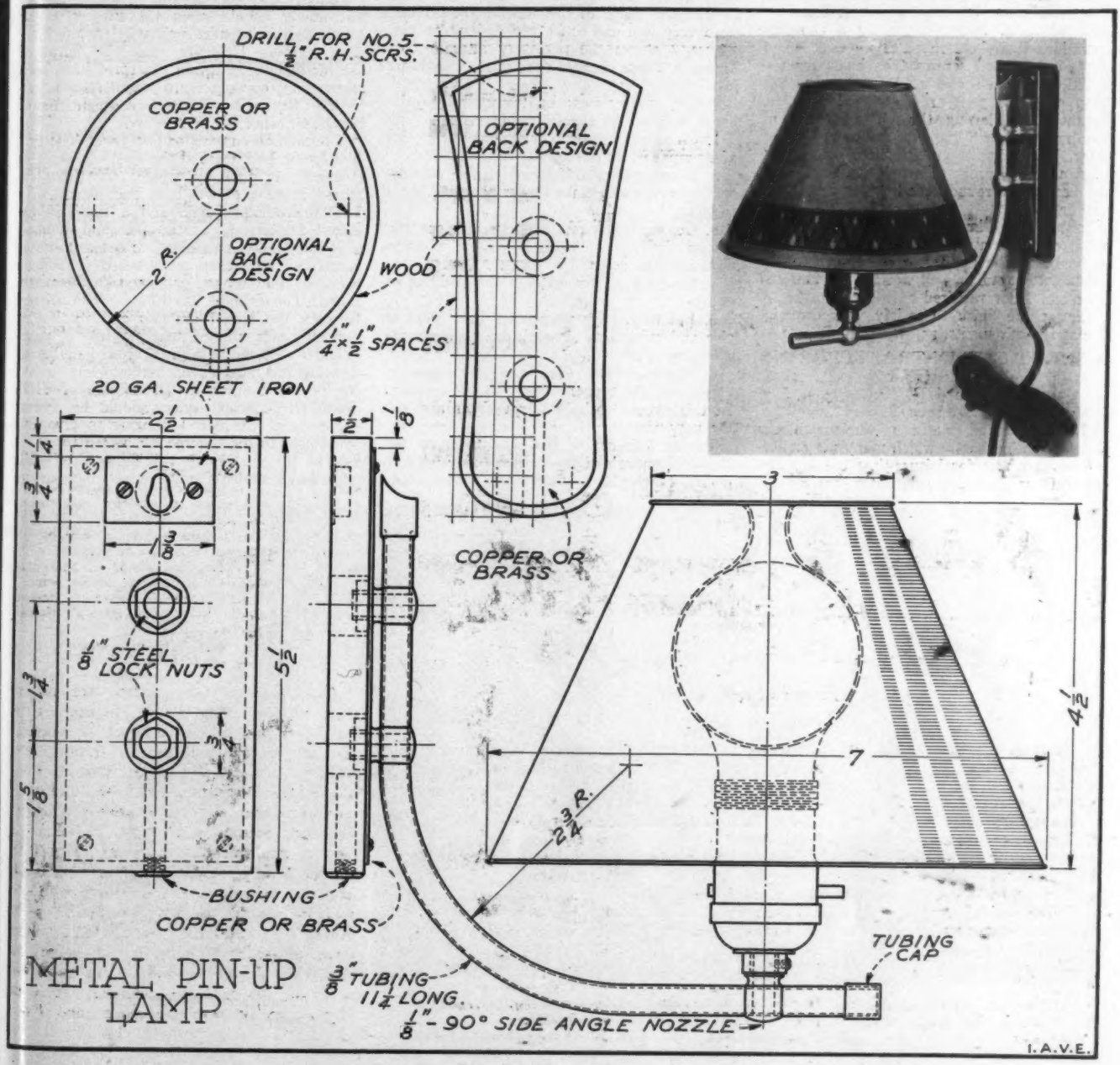
METAL PIN-UP LAMP

S. H. Puehler,
Milwaukee Public Schools,
Milwaukee, Wisconsin

A change from the customary material of band iron to copper or brass tubing gives an air of distinction to this project not found in the average pin-up lamp. The entrance of the lamp cord up through the back board is also more desirable than a lamp having its outlet in the socket only.

Although the title designates this lamp as a portable lamp, it may be used as a permanent wall fixture, providing some arrangement is made for fastening the back to an outlet box. A suitable back board of proper size and shape also must be chosen if this application is used.

Three ⅛-in. brass side-angle nozzles or 90-deg. elbows are made ready for use by drilling with a ⅜-in. drill to complete the hole for the insertion of a piece of ⅜-in. O.D. copper or brass tubing 11¼ in. long. The



tubing must be formed around some round object of desired circumference, remembering to slip on the two top elbows before squeezing the top end of the tubing in a vise. Saw and file the flattened tubing to shape. Slip on the lower elbow and also apply a tubing cap. The elbows and tubing cap are sweated onto the tubing with solder. These parts must be lined up correctly before heat is applied. Holes are then drilled into the tubing with a 9/32-in. drill. These holes are for the insertion of the wire.

The back plate of copper or brass is drilled for the insertion of two elbows which are locked in place with two ⅛-in. steel lock nuts. Holes in the back board at this location are ¾ in. or larger in size to allow for any variation in assembling the plate to the back board. Screw holes for fastening this plate to the back board are also located and drilled at this time. The drill size for the wire and bushing hole is chosen according to the size of the bushing obtainable.

The plate used in holding the lamp to the wall is a piece of 20-gauge sheet iron set flush with the back surface by a chiseling operation. It is held in place by two No. 4 by ⅜-in. flathead screws. The holes for the insertion of the screw used for hanging the lamp onto the wall are 3/16 and 5/16 in. respectively, allowing the circumference of one hole to touch the circumference of the other. Wood directly under these holes must be removed in order to provide clearance for the head of a roundheaded screw used as a wall fastening.

In pulling the lamp cord through the tubing a fish wire with a soldered connection is found to be best. The application of solder to the twisted wire joint is well worth the additional time and labor required.

Choose the finish to satisfy your own desire and requirements.

A SHORT CUT IN TRANSFERRING DESIGNS

Richard R. Kyl,
Des Moines, Iowa

The cutting and printing of linoleum blocks is a fascinating hobby which many are exploring as an outlet for leisure-time energy. Not least of the challenges which this craft offers is the preparation of the block for cutting.

Artists and advanced students usually draw their designs directly on the medium, apparently with little effort or worry. The novice, on the other hand, usually struggles along with the carbon-copy method of transposing designs onto the linoleum. Sooner or later he will realize that the lettering will be registered in reverse on the print unless it appears on the linoleum backward. Furthermore, regardless of the fact that it is obvious that the best design and lettering for block cutting should be in bold simple masses, he invariably chooses designs with too much detail. Even at best, the carbon-copy method is a difficult, laborious, and disheartening task. Slips occur; details are blurred and lost. For this reason, many beginners become discouraged and give up before they have made a real start.

In this article a method of transfer is shown which may help both teacher and student. Chose a suitable motif as, for instance, the greeting card shown in Figure 1. The original was printed in dark blue on a light blue background. Some of the lines on the original were very fine and much too difficult to cut. Figure 2 shows the necessary alteration of Figure 1. These changes were made with India ink.

Figure 2 may now be transposed to the blank linoleum in the following manner:

1. On an old magazine or several thicknesses of newspaper are placed the clean block.
2. Allow enough denatured alcohol to flow on the linoleum to make its surface wet. Avoid rubbing.
3. On the linoleum, while wet, place the chosen drawing or print in proper position with its face down.
4. Over all of this, place a flat padding of paper.
5. Put this entire assemblage in a press or vise and subject to considerable pressure for a few minutes.
6. Remove from the press and separate. Sometimes the papers adheres to the linoleum. In this event, wash in warm water and rub the paper away.

Figure 3 indicates that the linoleum has absorbed enough of the original copy with all detail intact. More than that, there is no doubt that the pattern in its entirety will register correctly when the block has been cut and reproductions made.

An original sketch in soft pencil may be transposed by rubbing its back vigorously with a spoon or burnisher after placing it face down on the linoleum. The pattern thus obtained is easily disfigured and obliterated and it is, therefore, unsatisfactory for most beginners. However, if the pencil drawing is filled in with India ink, it can be fixed to the linoleum by the steps previously listed in this manuscript for transposing Figure 2.

The writer uses standard 3/16-in. light-brown battleship linoleum for his work and finds it quite satisfactory and relatively inexpensive.

READING AND MEASURING WITH A MICROMETER

William E. Haynes,
Long Island City, New York

It may be wondered why so basic, even seemingly trite or prosaic, a topic as the micrometer should form the subject of an article that is intended primarily for machine-shop teachers. However, since the merits of the method to be herein described have been attested by co-workers to whom it was submitted, the writer believes it might be of benefit to other teachers as well.

The method consists of two parts. The first is teaching how to read the micrometer. This is effectively done by using a ten times enlarged drawing of the lines and figures of a 1-in. micrometer barrel and a similarly enlarged development of the lines and numbers of a micrometer thimble. The drawing of the barrel can be tacked on a board or bulletin board by the corners, or pasted on the blackboard. The thimble drawing is then slipped between the barrel drawing and its holder, and the ends clipped together into a paper cylinder that can be rotated around the barrel drawing and moved from right to left to take the positions of an actual thimble of a micrometer. Sufficient space should be left at the ends of the barrel drawing to give free movement to the thimble. Being ten times the size of the micrometer, all figures are easily seen by all students and it is not necessary to

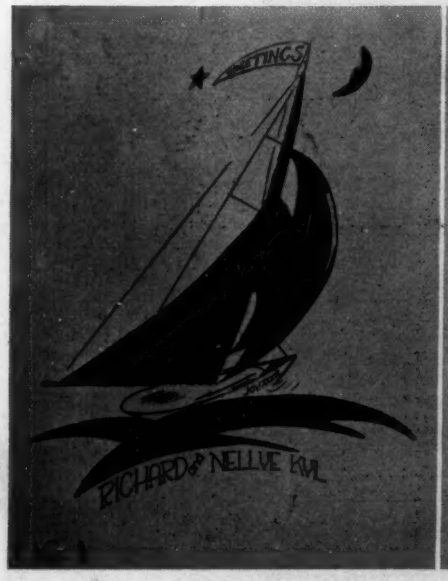


FIG. 1

The original

FIG. 2

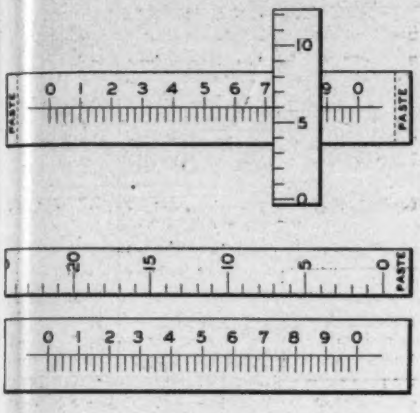
The original with changes, ready for the block

FIG. 3

Transferred to the block

give each one a micrometer. In fact this method centers the attention of the pupils on the teacher's device.

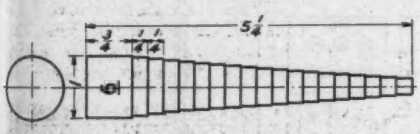
A few demonstrations are first made, then random readings are asked of each student and written on the board. Then the individual pupil is called upon to set the thimble at the proper place for one of the decimal numbers,



and the class is asked to check his setting. Then the thimble is set at random, the pupils are asked to read the setting individually and as a class. After a few trials it is surprising how readily the students learn to read and set a micrometer. The ease of making this device and its low cost are additional factors of merit. The instructor should see to it that the sizes that are frequently read incorrectly are set by the class.

The Step Bar

A device used by the writer to give practice and training in actually reading and setting a micrometer is called, for want of a better name, a step bar. It is usually made while teaching pupils to run a lathe. Each learner is permitted to cut a rough step approximately



¼ in. shorter than the previous learner. An advanced boy is then instructed to take a smooth finishing cut over each step with the admonition to cut sharp corners. These sizes are nonstandard, in fact the greater the oddity of the diameters the better. A number of bars are kept on hand, each stamped with a different number, and each step is carefully measured by the instructor and recorded in decimals on a library card. In use, the student is asked to record his measurements on a sheet of paper giving the number of the bar. These measurements are checked against the card. In this way the student measures without bias and does not attempt to make the reading meet a known size. The steps are made to increase by approximately 1/64 of an inch but not exactly 1/64, nor by the same amount for each step. The bars may also be used to give practice and training in measuring with spring calipers and working as close to micrometer sizes as the instructor desires or the capabilities of the pupils permit.

Instructions for using step bar

1. Note the number of the bar you have and record it on your sheet.
2. Measure each step carefully and set it down in decimals to three figures.
3. Measure each step a second time as a check on the first reading. Make these second measurements as independently of the first set as possible.

ROSE ARBORS

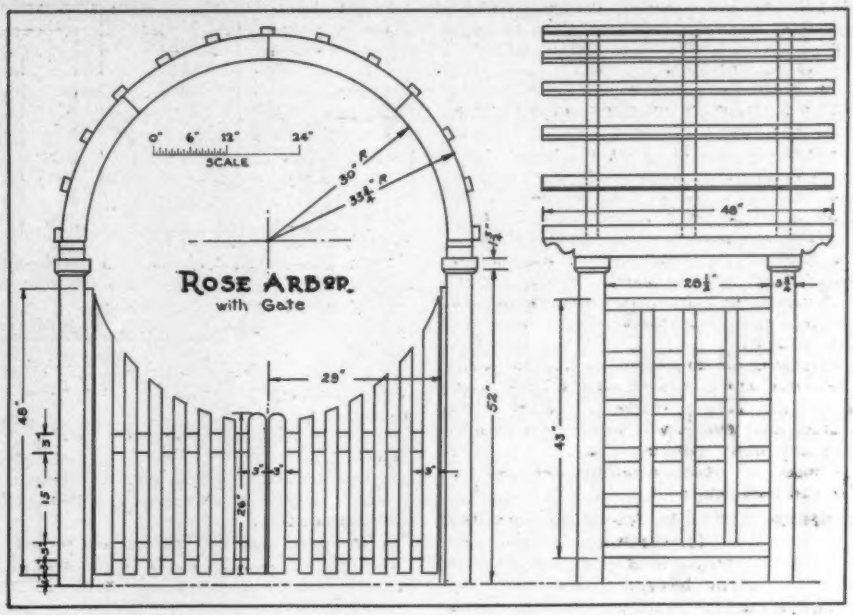
Deane E. Eldridge,
Head of Industrial Arts,
Junior High School,
Plymouth, Massachusetts

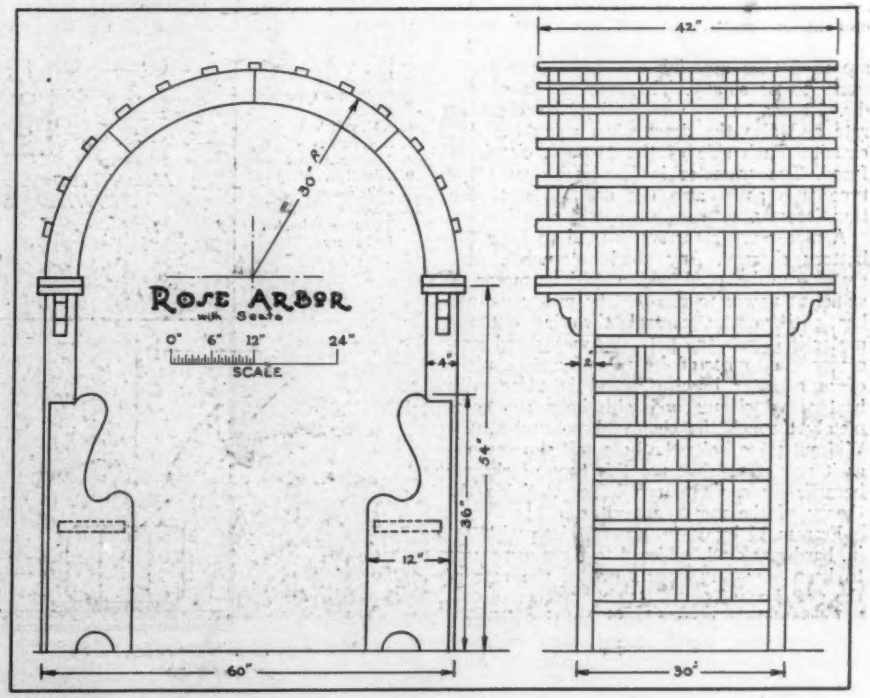
The two types of rose arbors shown herewith, represent the two types most often found; namely, the arbor with seats and the arbor with a gate. Both types meet a definite need but each measures up to the test of usefulness, sturdiness, and attractiveness which any well-designed project must meet. The two arbors represented here have actually been constructed and have proved satisfactory in all these qualities.

The corner posts were constructed of four-by-four or two-by-four construction lumber, although either could have been built up hollow but with little saving in cost. Sufficient length must be left on each post to set into the ground about two feet.

The curve for the arch was layed out full-size on a piece of wallboard and a quarter segment taken as a pattern. Four of these sections were needed for each arch and were made from two-by-eight pine, fastened by a grooved and splined joint. The remainder of the arbors were made from one-by-three pine except where the drawing calls for other dimensions.

Special gate hardware may be purchased at very moderate cost which will prove satis-





factory although the more ornamental hand-forged hardware will add greatly to the finished appearance. If the arbor is well painted and set into cement it will stand against the elements for years.

AN EFFICIENT SWITCHBOARD

Wesley B. Hammond,
Greigsville High School,
Retsof, New York

An efficient yet simple switchboard is a necessity when teaching general electricity or even general shop.

When constructing such a switchboard, five simple but highly pertinent essentials must be kept in mind.

1. A board of this type must be foolproof. In other words it cannot have open battery-type switches controlling high-voltage currents available to prying hands. It cannot have a system of switches which can be left on easily and so burn out some part of that system.
2. It should have a neat appearance so that it deserves placement in a neat shop. It should add and not subtract from the appearance of the shop.
3. Most important of all, the board should be as versatile as possible without detracting from its neatness and foolproofness. This particular board has available: two-, four-, and six-volt d.c. electricity at about twenty amperes; five- and ten-volt a.c. electricity at six amperes; and 110-volt a.c. It has facilities for charging batteries with a built-in ammeter to determine the charging rate.
4. It should be cheap to build, so that a school with limited funds may possess one.
5. It should be so designed as to be easily constructed so that the class can build it as a maintenance project.

Construction

The framework is constructed of 1 by 1-in. angle iron. A piece of five-ply wood was used as a foundation for the switches, etc. Shelves for the battery, transformer, and hydrometer were built at the bottom of this board. Ordinary house fixtures were used because of their foolproofness.

The switches are of the pilot-light type allowing the instructor to tell at a glance what circuit is on. Double duplex receptacles are used thus allowing two boys to use the same power supply. The ammeter is of the d.c. 20-zero-20 type so telling the charging rate and also the draw when using the d.c. circuits. Each side of the 110-volt circuit is fused. The ammeter is fused with an auto-type fuse as is also the dead side of the transformers.

A motor generator set is used to keep the battery charged. Any good automobile generator can be used and a ¼-h.p. motor is sufficient power to run it. The motor we use has a thermostat control, throwing out the motor if it gets too hot. The motor and generator are connected by use of a 4-in. piece of auto-heater hose, clamped in place with heater-hose clamps and with bolts run completely through the clamps, hose, and shafts. Without these bolts the hose will slip as soon as it gets warm. We use this type of charger because we can also use it for studying the theory of the motor generator.

Frames ⅛ by ½-in. wrought iron with ½-in. hardware cloth soldered to them were used to keep searching fingers out of the rear of the switchboard.

Large labels were placed on the different outlets so they could not be easily mistaken.

Leads were constructed of battery clips, heavy-duty rubber-covered cable, and rubber attachment plugs.

This board can be constructed for the comparatively economical sum of twenty-five dollars and even less if you do not have to buy all of the materials shown in the illustrations.

COFFEE TABLE

W. L. Conner,
Roosevelt Jr. High School,
Oklahoma City, Oklahoma

This table is easily within the reach of the ability of any pupil in trade and industrial

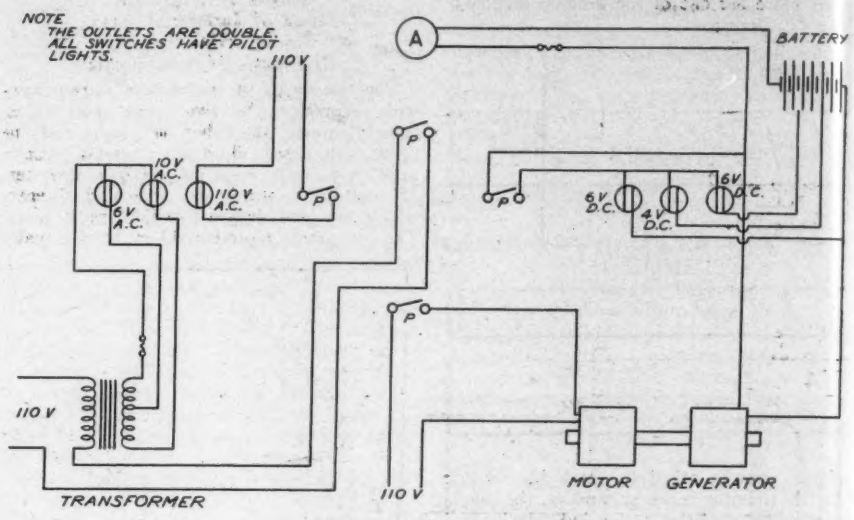
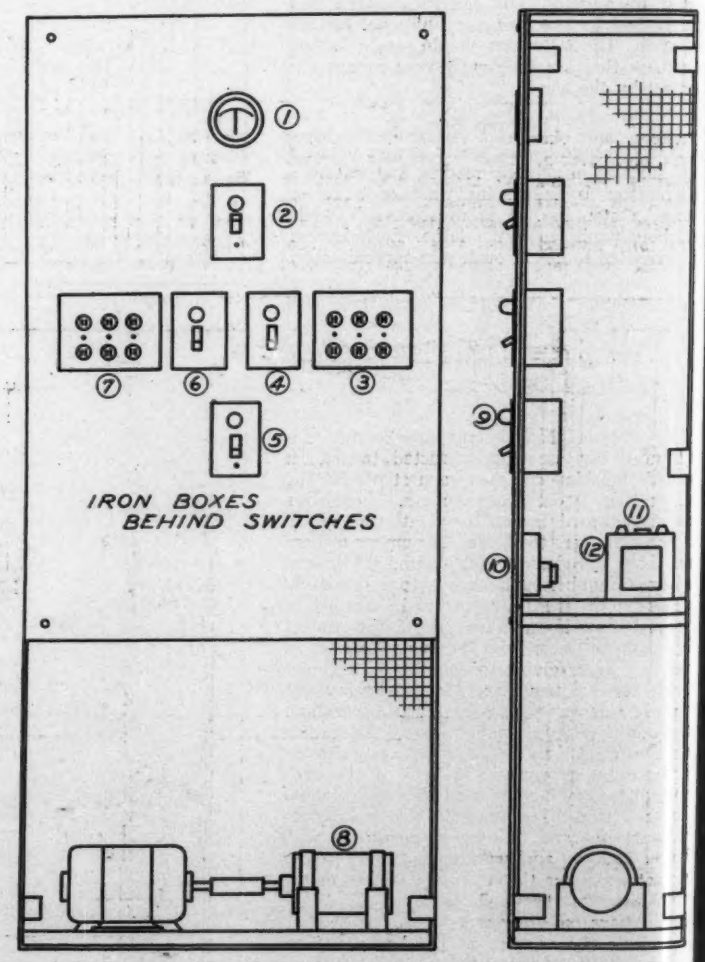


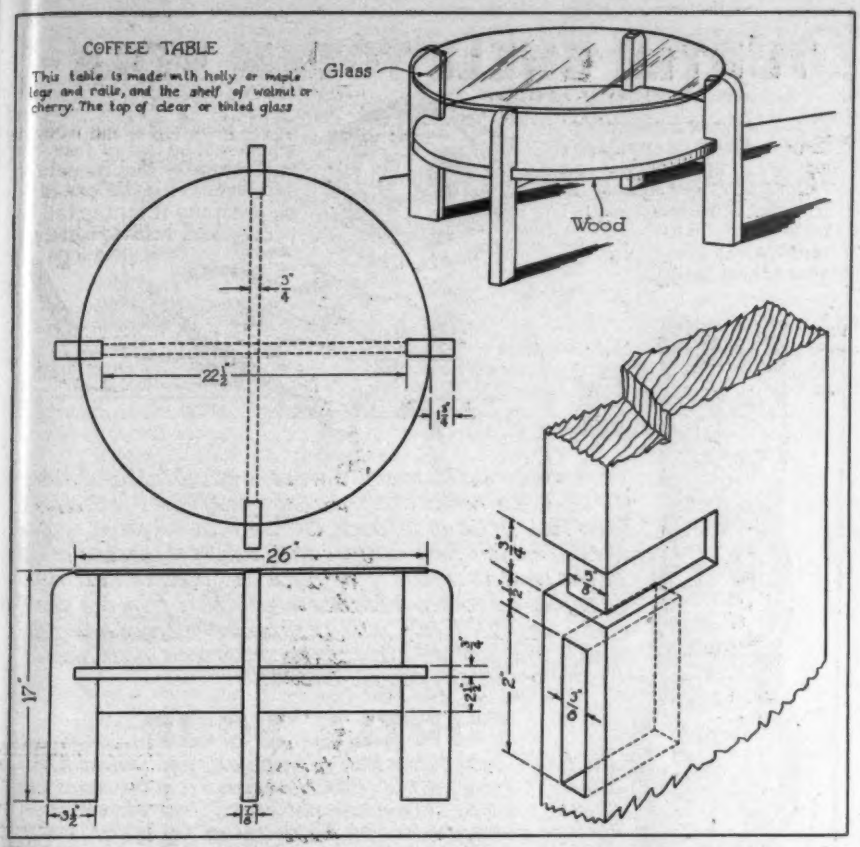
Diagram for switchboard



KEY

1. Ammeter
2. A.C. switch
3. D.C. outlets
4. D.C. switch
5. Motor-generator switch
6. A.C. switch
7. A.C. outlets
8. Motor generator
9. Pilot light on switches
10. Fuses
11. Transformer hidden by battery
12. Battery

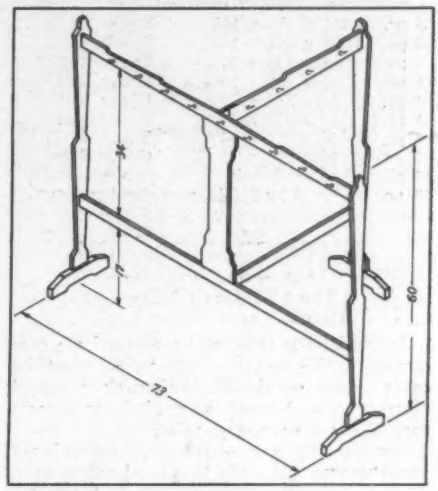
Electrical switchboard


COFFEE TABLE
This table is made with holly or maple legs and rails, and the shelf of walnut or cherry. The top of clear or tinted glass
Glass
Wood
26"
17"

training who plans to enter either carpentry or cabinetmaking, or for industrial-arts woodworking students of eighth-grade level or above. It is strictly modern in design but utilizes the type of construction that has been standard through the ages, such as, the mortise and tenon between legs and rails; the cross-lap joint between rails; and the modified dado joint between shelf and legs. The modified dado is used to lessen the strain on the rails, the grooves being cut in both sides of the leg ⅛ in. deep and the shelf notched to fit.

The glass top may be crystal clear or any of the many tints now available in plate glass. It may be constructed of one kind of wood or in combinations of two woods; such as, walnut and holly, walnut and maple, cherry and holly, cherry and maple, white pine and red gum, or any other suitable combination.

This piece of furniture is suitable in any living room regardless of the period since it does not clash with other furnishings but harmonizes with any background.



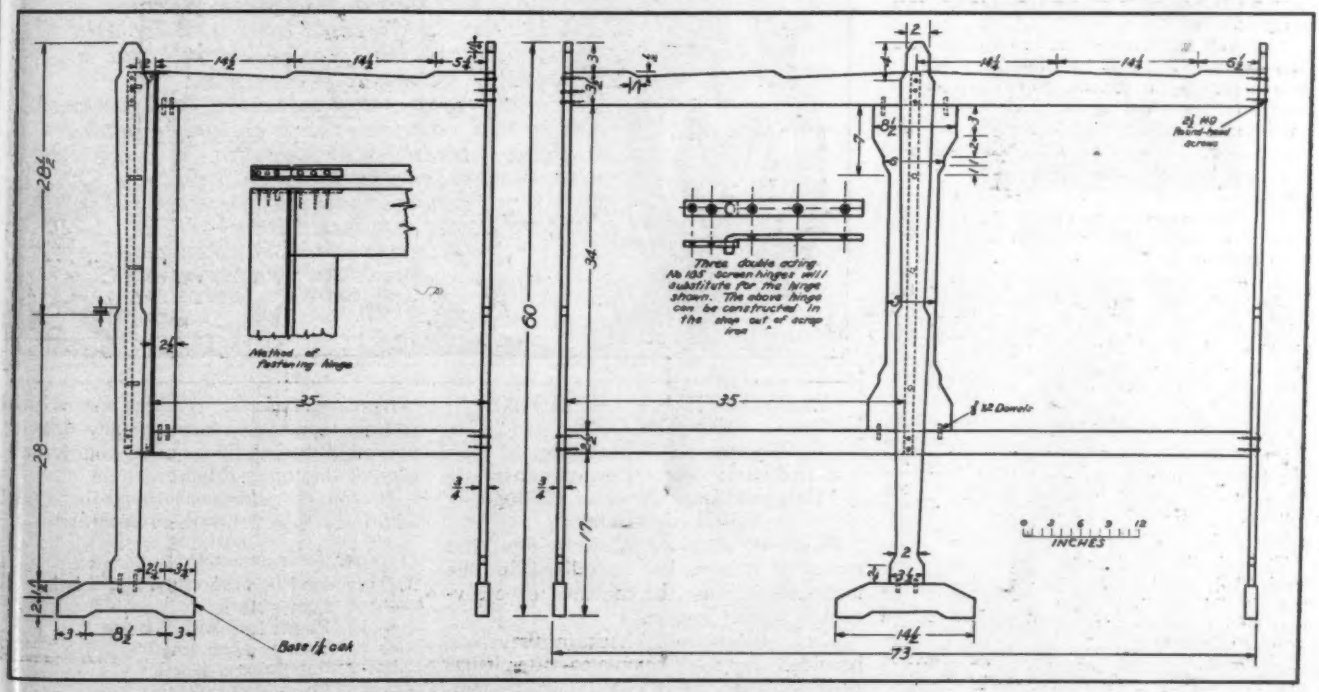
Costumer

COSTUMER

Ross Organ,
Peru, Nebraska

The costumer described herewith, is a worth-while project and requires but few tools in its construction. It is an excellent piece of furniture to have in schools, churches, lodges, clubs, and the like.

When the third leg is folded parallel with the other two it takes up but a minimum of



Costumer designed by Ross Organ, Peru, Nebraska

space and affords a large amount of room for hanging wraps. When more room is needed the third leg may be opened perpendicular to the other two and greatly increases the available hanging space.

If still more room is desired another swinging leg may be mounted on the side opposite to the one shown.

Oak is quite suitable for constructing this project.

Bill of Material

3 pc.	1½ x 3½ x 14½	Bases
3 pc.	¾ x 3½ x 56½	Standards
1 pc.	¾ x 3½ x 70½	Upper Rail
1 pc.	¾ x 2½ x 70½	Lower Rail
1 pc.	¾ x 3½ x 34½	Upper Rail
1 pc.	¾ x 2½ x 34¼	Lower Rail
1 pc.	¾ x 2½ x 34	Stile
1 pc.	¾ x 8½ x 34	Center Stile
14 pc.	⅜-in. dowels	
14 pc.	No. 9 by 2½-in. roundhead screws.	

TRAFFIC SAFETY SIGN

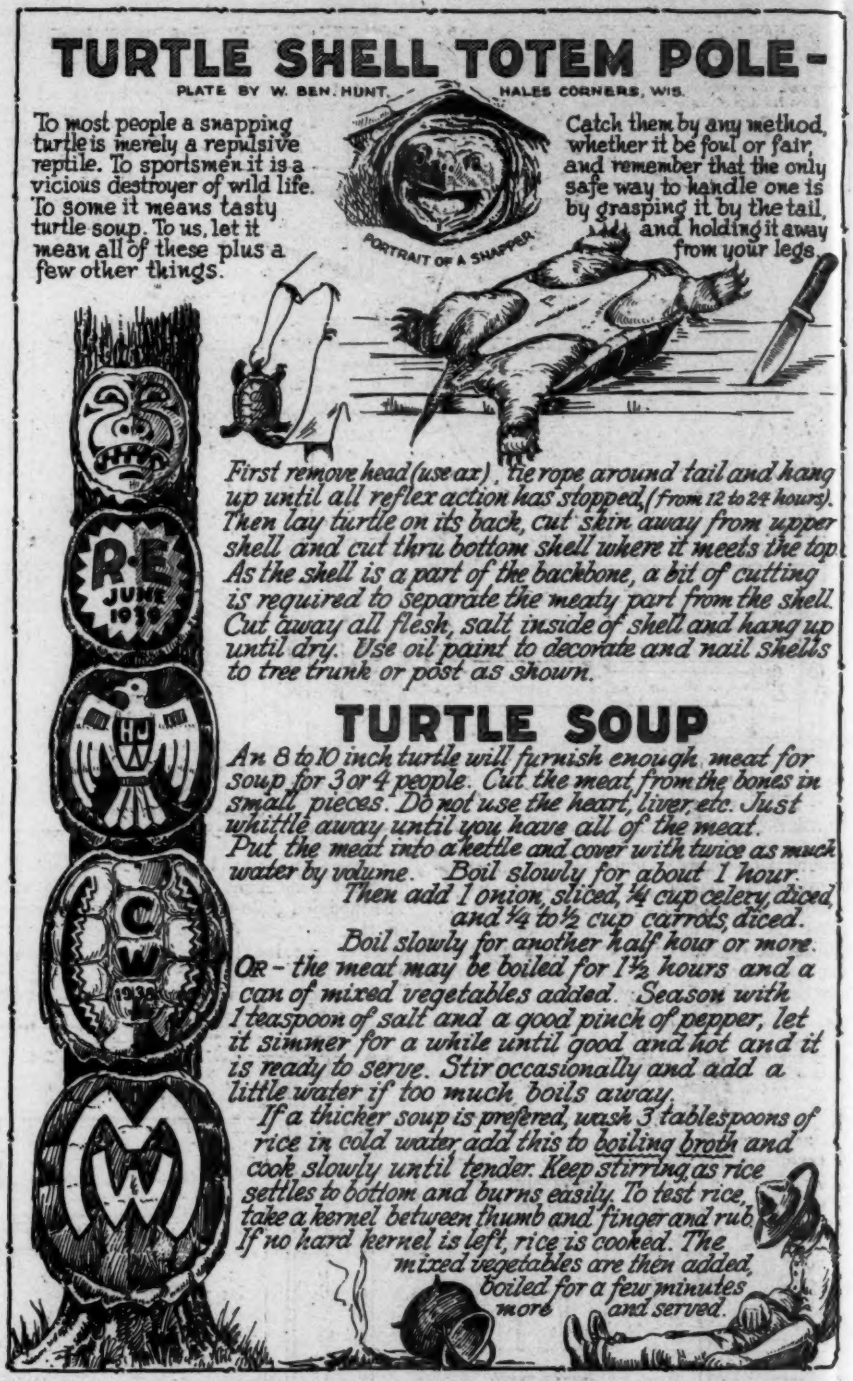
Harold H. Schwartz,
The Children's Village,
Dobbs Ferry, New York

Industrial-arts teachers have long been cognizant of the fact that the public must be made aware of the kind of work a school shop can do. A novel way of doing so was carried out in our shop recently.

Some of the boy scouts in the woodwork shop became interested in a local safety campaign. They wanted to make something to contribute to this campaign. As a result of this desire, each boy made a rough sketch of his idea. These were discussed in class. The plan most agreed on was to have some sort of a traffic sign of the "go slow" type. From an original drawing made by one boy, a project was finally worked up as shown. The cut-out represents a small girl holding a bag in one hand, on which the words "Give Us A Chance" was printed. This figure was made full size and cut out of 1¼-in. cypress, mounted, and painted in lifelike colors.

Traffic safety sign

Through the local scout master, the two traffic dolls were presented to the mayor of the city, during boy scout week. They are now set up in the middle of the road in front of the high school every day during school hours. They are very effective and look lifelike and natural as the motorist approaches them.


TURTLE SHELL TOTEM POLE-
PLATE BY W. BEN. HUNT. HALES CORNERS, WIS.
To most people a snapping turtle is merely a repulsive reptile. To sportsmen it is a vicious destroyer of wild life. To some it means tasty turtle soup. To us, let it mean all of these plus a few other things.
PORTRAIT OF A SNAPPER
Catch them by any method, whether it be foul or fair, and remember that the only safe way to handle one is by grasping it by the tail, and holding it away from your legs.
R·E JUNE 1939
C W 1939
First remove head (use ax). Tie rope around tail and hang up until all reflex action has stopped, (from 12 to 24 hours). Then lay turtle on its back, cut skin away from upper shell and cut thru bottom shell where it meets the top. As the shell is a part of the backbone, a bit of cutting is required to separate the meaty part from the shell. Cut away all flesh, salt inside of shell and hang up until dry. Use oil paint to decorate and nail shells to tree trunk or post as shown.
TURTLE SOUP
An 8 to 10 inch turtle will furnish enough meat for soup for 3 or 4 people. Cut the meat from the bones in small pieces. Do not use the heart, liver, etc. Just whittle away until you have all of the meat. Put the meat into a kettle and cover with twice as much water by volume. Boil slowly for about 1 hour. Then add 1 onion, sliced, ¼ cup celery, diced, and ¼ to ½ cup carrots, diced. Boil slowly for another half hour or more.
OR - the meat may be boiled for 1½ hours and a can of mixed vegetables added. Season with 1 teaspoon of salt and a good pinch of pepper, let it simmer for a while until good and hot and it is ready to serve. Stir occasionally and add a little water if too much boils away.
If a thicker soup is prefered, wash 3 tablespoons of rice in cold water add this to boiling broth and cook slowly until tender. Keep stirring as rice settles to bottom and burns easily. To test rice, take a kernel between thumb and finger and rub. If no hard kernel is left, rice is cooked. The mixed vegetables are then added, boiled for a few minutes more and served.

ELEMENTARY GENERAL WOODWORK

George A. Willoughby,
Industrial Arts Department,
Michigan State Normal College,
Ypsilanti, Michigan

Processes, activities, projects, jobs, and topics of information underlined by the instructor indicate the contents to be covered in a given course.

Each student will check in the space provided, any work completed, after it has been approved by the instructor, to indicate his accomplishments.

Note to students: A check means that you are ready to be tested at any time on your ability to do things or on your knowledge of the topics listed.

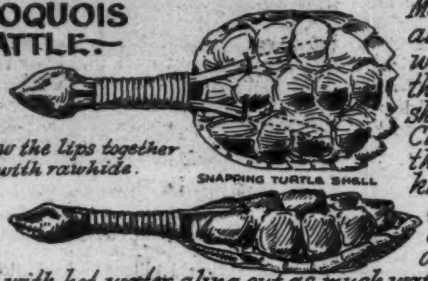
If you do additional things or study additional topics, list them separately.

Processes to be performed:

A. Turn wood between centers on a lathe
—— 1. Center stock
—— 2. Rough turn with a gouge
—— 3. Turn to exact length
—— 4. Cut to exact length
—— 5. Cut to exact depth
—— 6. Make concave cuts

OTHER USES FOR TURTLE SHELLS

IROQUOIS RATTLE



Making an Iroquois rattle is almost a taxidermy job, but is worth the trouble. First cut off the legs and tail, leaving enough skin for sewing up the openings. Clean out the insides thru these openings with a long, thin knife. Cut away as much meat as possible from the neck bones but leave the bones in. Cut out tongue. Now wash every part with hot water, sling out as much water as possible and hang up for a half hour or so. Then dust the inside thoroughly with powdered alum. Get enough on. Then before the skin dries, sew up the tail and leg openings with thin rawhide lacing. Tie a cord loosely around the neck just back of the head, stretch out the neck, & let it hang until thoroughly dry. Cutting the holes in the shell for the sticks will let air circulate in the inside and hasten the drying. When dry, cut flat hickory strips as shown, drop some shot or pebbles into shell, insert ends of sticks, (note dotted lines) and fasten by wrapping with strips of flat basswood bark. A 7 inch shell make a nice sized rattle.

BOX TURTLE RATTLE

WHITTLED STICK
WRAP PROJECTING END OF STICK WITH LEATHER OR CORD TO HOLD IT IN PLACE.
SIDE VIEW OF BOX TURTLE RATTLE.
FRONT - SHOWING WHERE END OF STICK COMES THROUGH.

Box turtle rattles are very easy to make. Clean out the inside of the turtle very carefully, wash out with hot water and sprinkle thoroughly with powdered alum. Then drill holes, as shown, with a pocket knife, and whittle the handle. Put stones or shot into the shell and close it up. These shells close up completely. Push the stick thru the holes and tie some cord or leather around the end projecting thru the front part of the lower shell as shown and your rattle is read to dry. The handle can be painted or covered with red cloth.

NECKERCHIEF SLIDES

can be made from common mud turtles. Clean out the shell nicely and sprinkle inside with powdered alum. Then insert a smooth stick about the size of the ordinary slide opening & let the shell dry on it. Otherwise the shell might shrink or curl too much.

Baby turtles have very thin, soft shells, so take it easy with your knife.

LEG RATTLES

These can be made from mud turtle shells, 4 or 5 inches long. Tin cones or cartridge shells are tied to thong as shown. Do not remove lower shell, as the tie cords pass between the two shells. The lower shell then fits flat against the leg and prevents scratches.

—— 7. Make convex cuts
—— 8. Smooth ends with a skew chisel
—— 9. Cut V grooves with a skew chisel
—— 10. Turn beads with a skew chisel
—— 11. Turn recesses
—— 12. Turn duplicate parts

B. Turn wood on a faceplate or chuck
—— 13. Fasten stock to a metal faceplate
—— 14. Mount stock on a screw chuck
—— 15. Fasten stock on a wooden faceplate
—— 16. Reduce stock to a disk or cylinder
—— 17. Cut recesses in a disk
—— 18. Scrape beads
—— 19. Turn stock on a plug chuck
—— 20. Turn stock on both sides using an inside or an outside chuck

C. Finish on a lathe
—— 21. Smooth with sandpaper
—— 22. Apply shellac-oil finish
—— 23. Polish a project

D. Cut and work stock with a circular saw
—— 24. Rip stock with the grain
—— 25. Cut across the grain
—— 26. Cut duplicate pieces of a given length
—— 27. Cut angles —— 31. Cut a dado
—— 28. Cut a rabbet —— 32. Cut a gain
—— 29. Cut a bevel —— 33. Cut a tenon
—— 30. Cut a groove —— 34. Cut molding
—— 35. Cut a tongue and groove joint

E. Cut with a jig saw or band saw
—— 36. Cut intricate curves in thin stock
—— 37. Cut duplicate parts
—— 38. Cut long curves
—— 39. Make straight cuts
—— 40. Round corners
—— 41. Cut tenons
—— 42. Resaw stock

F. Smooth and shape stock with a jointer
—— 43. Smooth an edge
—— 44. Smooth a surface
—— 45. Cut a chamfer
—— 46. Cut a straight taper
—— 47. Cut a stop taper
—— 48. Cut a rabbet

G. Sand pieces with a belt or disk sander
—— 49. Sand edges
—— 50. Sand broad surfaces
—— 51. Sand curved surfaces

H. Sand pieces with a belt or disk sander
—— 52. Clean and oil a lathe
—— 53. Sharpen a chisel
—— 54. Grind a parting tool
—— 55. Grind a skew chisel
—— 56. Sharpen a round-nose chisel
—— 57. Sharpen a gouge

I. Miscellaneous processes in addition to those above
—— 58. Lay out a common rafter
—— 59. Inlay lines or bands

Topics to be studied:
—— 1. Common machine safety practice
—— 2. Care, use, and parts of wood lathes
—— 3. Names and uses of common lathe tools
—— 4. Proper cutting speeds for lathes
—— 5. Types and care of grinding wheels
—— 6. Care, uses, and parts of circular saws
—— 7. Care, uses, and parts of band saws
—— 8. Care, use, and parts of jig saws
—— 9. Care and parts of power jointers
—— 10. Types, parts, and care of power sanders
—— 11. Care, use, and parts of power planers
—— 12. Care, use, and parts of hand and power mortisers
—— 13. Care, use, and parts of power shapers
—— 14. Care, use, and parts of power routers
—— 15. Duties of various woodworkers

Suggested things to do:

Plan and construct some of the following:

1. Wood turning on a lathe
   a) Turning only
   —— File handle —— Indian club
   —— Chisel handle —— Tenpins
   —— Mallet handle —— Table lamp
   —— Mallet head —— Match holder
   —— Gavel head —— Pin tray
   —— Gavel handle —— Jewel box
   —— Darning ball —— Shuffle-board disks
   —— Candlestick —— Sprue pin
   —— Molding rammer
   b) Turning in patternmaking
   —— Plumbob
   —— Handle for fireplace set
   —— Sundial base —— Shaft hanger
   —— Pulley —— Hand wheel
   c) Turning in cabinetmaking
   —— Legs for a table
   —— Furniture ornaments
   —— Legs for a footstool
   —— Drawer pull
2. Carpentry
   a) Buildings
   —— Garage —— Doghouse
   —— Summer cottage —— Pumphouse
   —— Hunting lodge —— Tool shed
   —— Workshop

b) Miscellaneous

—— Flower box —— Pig trough
—— Lawn furniture —— Sawhorse
—— Trellises —— Stepladder
—— Fence —— Crate
—— Gate —— Hotbed frame
—— Nest holder —— Wagon box

3. Patternmaking
(See turning)

—— Book ends —— Machine guard
—— Plaque —— Machine base
—— Machine parts

4. Furniture and cabinetmaking

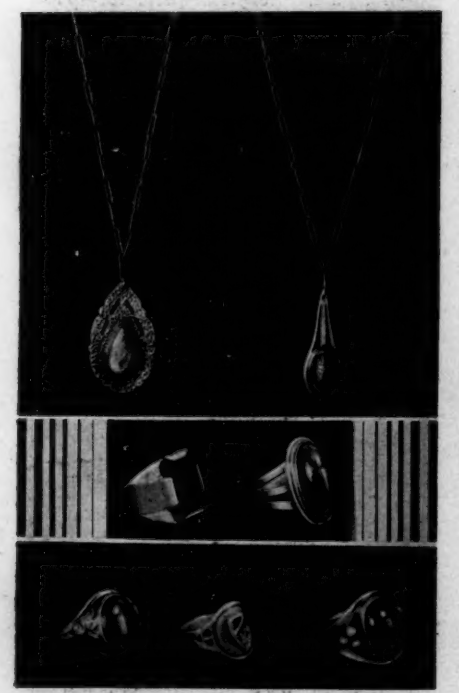
—— Table desk —— End table
—— Tilt-top table
—— Chess and checker table
—— Sewing cabinet
—— Magazine stand
—— Hanging bookshelves
—— Telephone cabinet —— Bookstand
—— Telephone bench —— Umbrella stand
—— Tea wagon —— Hall rack
—— Writing desk —— Linen chest
—— Book trough —— Wall cabinet
—— Gate-leg table —— Drop-leaf table
—— Card table —— Bookcase
—— Footstool —— China cabinet
—— Taboret —— Smoking table

JEWELRY MAKING

Alfred L. Thiede,
State Teachers College,
Mankato, Minnesota

Shop teachers who are searching for new phases of work and who have not tried jewelry making will find it interesting to teach and fascinating to the students. Anyone now teaching art-metal work can introduce the work with addition of a few pieces of inexpensive equipment. The articles shown are the first projects in jewelry made by a group of students who had previously completed a unit in art-metal work.

The materials used can be inexpensive because the pieces used are quite small in most cases. As the student progresses and wishes to use sterling silver in place of nickel silver, monel metal or other alloys the cost will be increased. However, sterling-silver rings, brooches, or pendants are not too expensive for most students when the pieces made are not exceptionally large.



Jewelry made by beginners

Work in jewelry making introduces the student to many new materials and operations.

The work appeals to boys and to girls and both can succeed in the work. An article to be made is usually planned for the one making the piece or for a gift and is usually put to immediate and continued use. The projects give opportunity for originality of design.

The work will appeal to the leisure-time worker because of the inexpensive equipment as mentioned previously and because a large work station is not necessary. The worker can be seated at a small table and carry on all his work. The work also appeals because most articles do not take a long time to complete. It offers chances for development by going into more difficult pieces and by adding new operations such as carving, repoussé, casting, enameling, and other forms of ornamentation.

SAFE DRIVING

The following, which appears on the back cover of the 1940 edition of the motor-vehicle laws of the State of Missouri, may well be embodied in the safe driving lessons of any out course:

1. Don't pass on hills or blind curves — you might just as well drive blindfolded.
2. Don't fail to signal all turns — the fellow behind is entitled to this courtesy.
3. Don't challenge the right-of-way — if in doubt, take no chances.
4. Don't cut corners — that's the other fellow's territory and he might claim it.
5. Don't cut in sharply after passing — the driver you pass hates the ditch as much as you do.
6. Don't weave all over the highway — your half of the road is on the right.
7. Don't come to sudden stops without signaling — rear-end crashes are costly.
8. Don't lag in traffic — you have no right to delay those behind.
9. Don't take a chance with faulty brakes or tires — it's a saving you'll regret.
10. Don't be reckless at any time — you endanger not only your own life, but the other fellow's as well.
11. Don't drive with blinding lights — the driver approaching hates it as much as you do.
12. Don't race for an intersection, then stop suddenly — brakes have been known to fail.
13. Don't drive if you drink. Don't drink if you drive.
14. Keep a safe, clear stopping distance ahead of you. Something unexpected might happen to the vehicle ahead.
15. Drive sanely — signal plainly. Save a life — perhaps your own.

TO MAKE A RIVETED BOX

R. W. Wagner,
St. Paul, Minnesota

Squaring

A From the drawing, calculate how large a piece of metal will be needed to make the box. Get an oversized piece from your teacher.

B Stamp your shop number on the piece as

1. Stamping the numbers on metal.
2. Selecting the square corner.
3. Marking the working edges.

in Figure 1. Place a lead block under the metal.

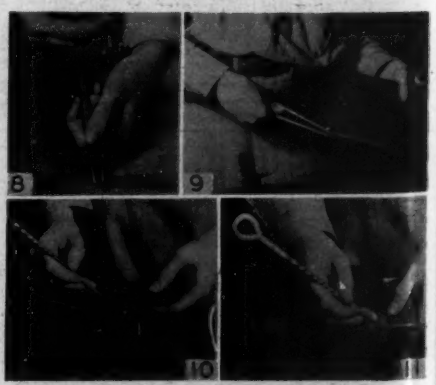
C Find a square corner by trying with a square as in Figure 2.

D Mark the two edges that meet at this corner as in Figure 3. These are the "working edges."

E Lay off correct length and width from these edges. First lay off the width as in Figure 4, then the length as in Figure 5. Don't square these lines clear across the sheet. A short mark at the edge is all that is needed.

4. Laying off width. 5. Laying off length. 6. Cutting off first waste edge. 7. Cutting off second waste edge

F Cut off waste edges on the squaring shears. Place the metal as in Figure 6, so the working edge is against the side gauge and the waste edge is under the knife. Get the mark even with the blade and cut off the waste. Move to the other



8. Setting divider for scribing.
9. Scribing with divider. 10. Holding the square against a working edge.
11. Wrong place to hold square

side gauge as in Figure 7 and cut off the other waste edge in the same way. *Never put a waste edge against the gauge. Never cut off a working edge!*

G Report the squaring.

Layout

A Scribe the hem allowances all the way around the sheet, using the divider. First set the divider as shown in Figure 8 by holding one point *against the end of the rule* and the other on the 1-in. division. The line is scribed as shown in Figure 9. Note that one leg slides along the edge of the metal while the other makes a mark on the sheet. Hold the divider so the hand will not squeeze the legs together.

B Square the four lines (*A, B, C, D,* on the drawing) across the sheet. Be sure to hold the square against a working edge as shown in Figure 10, and *not* against the other edge as shown in Figure 11.

C Lay out the laps. Then lay out the location of the rivet holes.

D Report the layout.

Cutting and Punching

A Cut away the corners. This kind of cutting is called *notching*. When notching holds the ends of the blades even with the stopping point as shown in Figure 12.

Do not open the blades up wide and try to stop at the stopping point as shown in Figure 13. To overcut a notch, weakens it.

12. Correct way to notch. 13. Incorrect way to notch. 14. Deciding on size of punch. 15. Making the depression. 16. Looking at the depression

B Select a solid punch slightly larger than the rivet to be used. Get a rivet of the required size and hold the stem of it against the end of the punch as shown in Figure 14, to decide on the size.

C Punch the rivet holes in the laps.

Place metal on a lead block. Strike the punch a light blow making a slight depression, without cutting through, as shown in Figure 15. Look at this depression to see if it is properly located with the center lines, as shown in Figure 16.

If it should *not* be centered, allowance will have to be made when punch is replaced and hole punched clear through. Replace the punch in the proper location and punch the hole clear through.

Do not drive the punch deep into the lead block. Drive it just far enough to cut through the metal.

17. Bending over the box side with the hand. 18. Dressing the bend. 19. Dressing the bend in box end. 20. Bending over the laps.

D Report the cutting and punching.

Forming

A Hem the four edges. Have the layout marks down toward the bench.

B Form the sides of the box.

Use the beakhorn stake. First bend the metal over the stake with the hands as shown in Figure 17.

Then strike each side of the bend with a mallet, to square up the bend as shown in Figure 18. Try to get a square, clean corner.

C Form the ends, in the same way, using the square stake as in Figure 19. Make the hemmed edges at the top come even.

D Form the laps using the beakhorn stake as shown in Figure 20. Force the laps under the hems. Make the ends of the hems come close together.

E Report the forming.

Riveting

A Punch the holes in the ends of the box.

Squeeze in on the sides of the box as shown in Figure 21 and mark the location of the holes on the end of the box, through the hole in the lap. Bend the side of the box out so the mark on the end can be seen. Place a lead block

21. Locating the holes in box end. 22. Punching a hole in the end. 23. First step in riveting: drawing up, using hole in rivet set. 24. Second step: upsetting, using hammer face. 25. Third step: setting, using the cup in the rivet set

on a stake and punch the hole as shown in Figure 22.

B Get four rivets of the size specified. Then select a rivet set with a hole in it slightly larger than the stem of the rivet.

C Rivet the laps.

After inserting the rivet, the following three steps are taken:

First parts are drawn up by slipping the hole in the rivet set down over the stem of the rivet and striking it, as in Figure 23.

Second the end of the stem is upset by striking it with the face of the hammer. Don't flatten stem clean down; only about halfway. See Figure 24.

Third the rivet is set by placing the cup in the set down over the upset stem and striking it a few hard blows to round off the end. See Figure 25.

D Report the riveting. Wipe over the box with oily waste before taking it home.

A MARKER FOR TREES ON THE SCHOOL GROUNDS

Cavins Baughman,
Detroit University School,
Grosse Pointe, Michigan

A project which has been of interest to the school and has proved a good stimulus to patternmaking and foundry operations has been used for several years in our school. On Arbor Day each year a tree is planted on the school grounds by the senior class. The general shop class makes a marker for the base of the tree giving the name of the species

Tree marker

and the year of the planting. Our general shop activities are highly individualized and the different phases of work are optional. The project here described when carried out as a class project serves to stimulate interest in pattern, foundry, and concrete work. It serves as a good demonstration of these activities and usually results in several of the pupils taking up similar problems.

Patternmaker's letters are purchased from a foundry supply house and attached to a plate with border, allowing proper draft, and finish to form the pattern. A regular casting can be made if complete facilities are available. If not, a mold without a cope can be made in an improvised drag and the casting made "open face" as it were. We are limited

in the heat our furnace will provide and have used lead or metals with a low melting point for the casting. A couple of bolts or metal rods are inserted in the casting for anchoring it to the concrete base.

The base is a simple concrete block which gives opportunity to discuss the mixtures of cement, water, and aggregates for different purposes.

This school project can be divided into operations so that all the members of the class will have a part in the work. Some will work on the pattern, some on the molding, some on pouring the casting, some can clean the casting, some make the form for the concrete base, some mix the concrete, and even the poorest workman has his part in helping carry the marker out and "planting" it.

ELECTRIC TOP

Joseph J. Lukowitz,
Milwaukee Public Schools,
Milwaukee, Wisconsin

The writer offers his apologies to E. W. Jones, from whose book, *Applied Electricity*,* this project was adapted.

Variations in design and materials of construction have been made to simplify the construction and thus bring this excellent project within the range of a larger number of students. The construction of this electric top has been found to be good preparation for subsequent construction of an electric motor because it illustrates in a very simple manner how magnetic pull can be converted to rotary motion.

The top will run at high speed from two dry cells or from a toy-train transformer. The construction is very simple. Complete details are given in Figure 1. To operate the top make connections to dry cells or transformer as indicated in Figure 1. The wire making contact with the rotor should contact the rotor when an arm of the rotor is about ¾ in. from the center of the electromagnet. This will close the circuit, energize the electromagnet, and pull the rotor around. The wire should be held at such an angle that as the arm reaches the core of the magnet the wire will break contact with the rotor thus opening the circuit and allowing the rotor to coast until the other arm is about ¾ in. from the core of the magnet when the wire will again contact the rotor thus again energizing the electromagnet and pulling the other arm around. Thus the rotor receives two impulses each revolution. The upper bearing bracket must be adjusted so that the rotor revolves very freely. The adjustment can be easily made by removing the rotor and springing the bracket slightly.

The dimensions shown in Figure 1 are not absolutely required and variations may be made. The 3/16-in. hem, where specified, may be eliminated but a neater appearance and more rigidity will be attained by its use. Either annunciator wire or magnet wire may be used for the coil. A rivet or a nail may be substituted for the stove bolt.

*Published by the Bruce Publishing Co., Milwaukee, Wis.

CHIP HOLDER

Otto A. Northquest,
Milwaukee Public Schools,
Milwaukee, Wisconsin

We have had many requests from the students in our ninth-grade metal classes for a project to hold the so-called "poker chips." To fill this need a holder was designed that could be made by the boys without too much difficulty and at the same time keep the cost within the reach of all. The average ninth grader, with a fair knowledge of the metal-working operations, will find much pleasure in watching this project develop.

Chip holder

Start with the base. The holder may be made of copper or brass or a combination of the two. In either case use No. 19 gauge metal. Draw a circle on the metal and cut

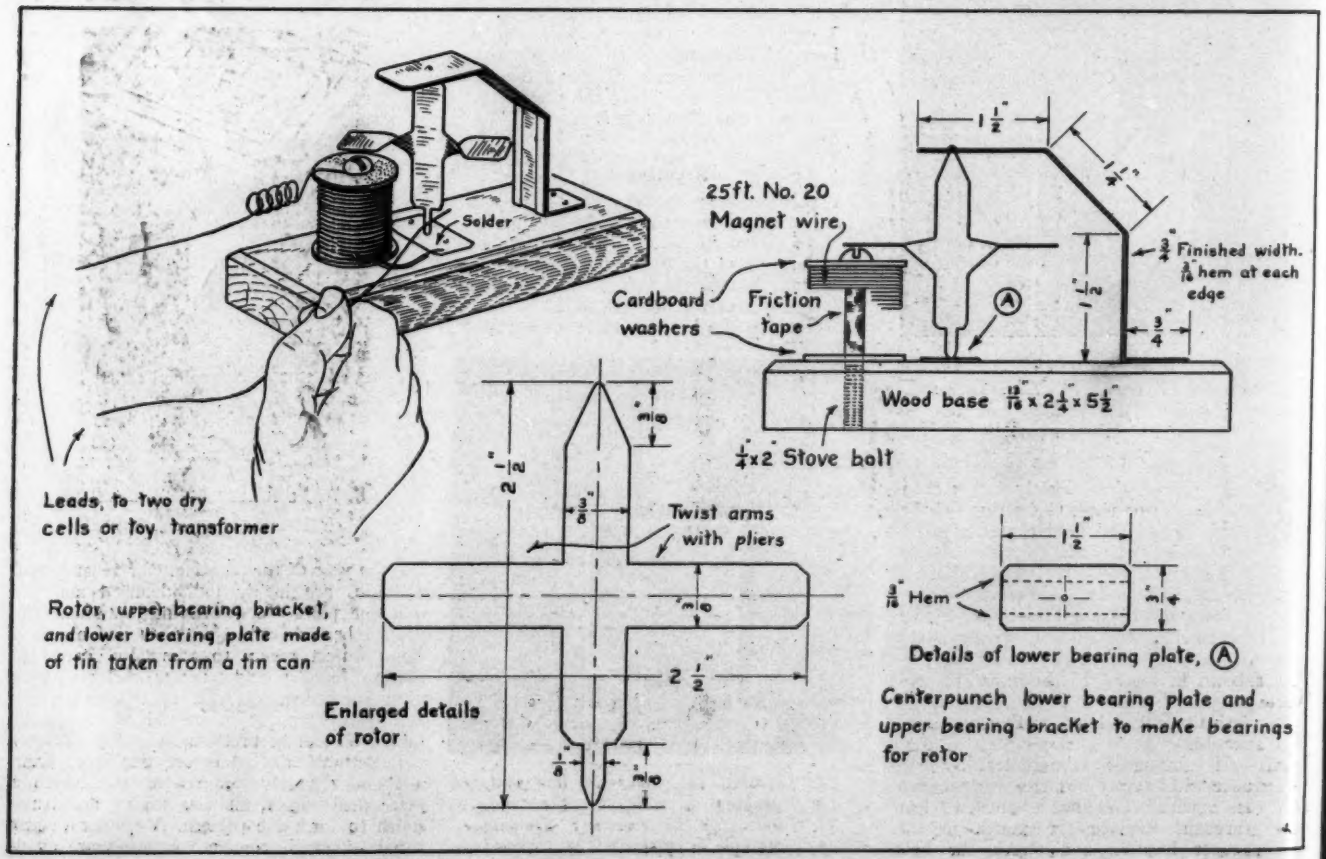
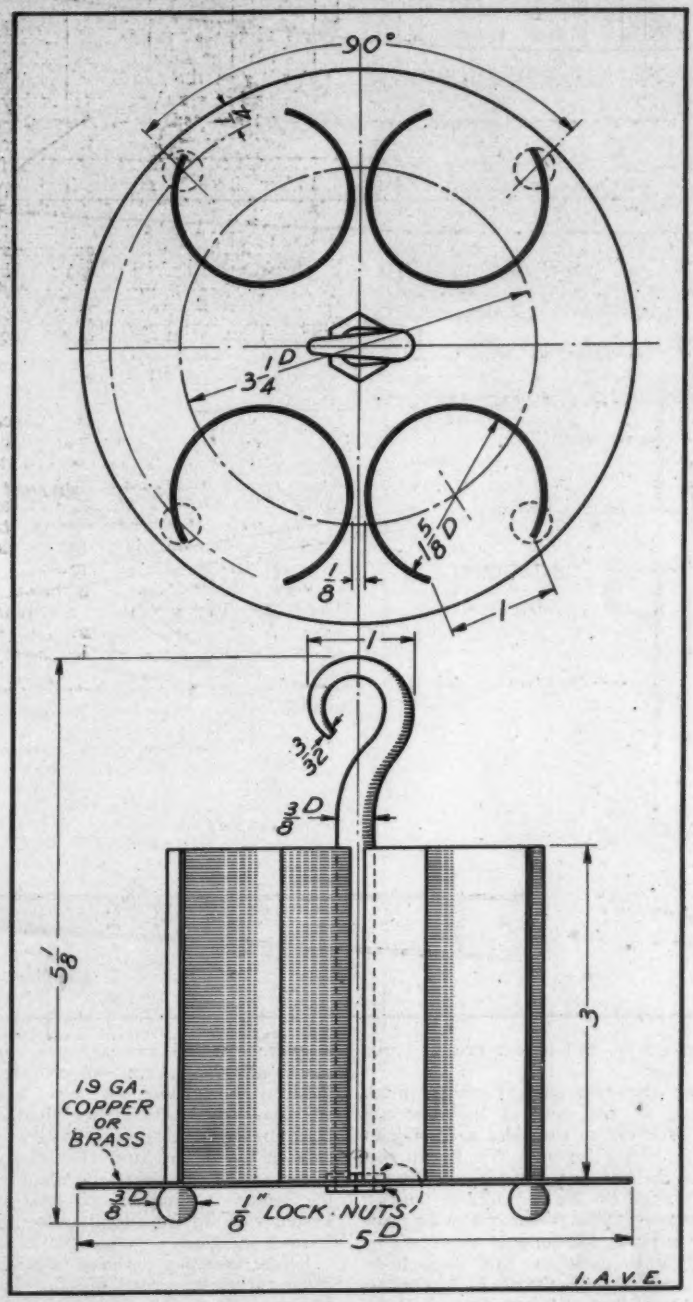

Solder
Leads, to two dry cells or toy transformer
25ft. No. 20 Magnet wire
Cardboard washers
Friction tape
Finished width.
hem at each edge
Wood base
Stove bolt
Twist arms with pliers
Rotor, upper bearing bracket, and lower bearing plate made of tin taken from a tin can
Enlarged details of rotor
Hem
Details of lower bearing plate, A
Centerpunch lower bearing plate and upper bearing bracket to make bearings for rotor

Fig. 1. Details of electric top.

it out. Center punch the center for the hole which will be drilled later. When filing the circle, hold the metal against a wood block held in the vise. This will remove all danger of getting vise marks on the metal. After the base has been filed, emery the edges so that they feel smooth and free from sharp edges.

Slip the tube in this, chuck it in the lathe and face both ends. Use the same cylinder when sawing and filing to maintain the roundness of the tube.

The feet consist of any suitable brass turning that may be obtained from electrical-appliance shops. Locate them on the base and



Chip holder

Now drill a 3/16-in. hole in the center for the handle.

The uprights to hold the chips are made from a 1 5/8-in. tube. Use tubes with as thin a wall as is possible to obtain. This reduces the cost of the holder considerably. Square both ends and be sure that they are all the same length. Then draw two lines down the side one inch apart. Saw this piece out and file both edges. You may find it convenient to turn a wood cylinder the size of the tube.

solder. A Bunsen burner is excellent for this soldering operation. Use flux and solder sparingly and just enough heat to melt the solder.

The tubes are now put in place. Leave enough room between the two pair for a deck of cards to stand. Be sure that the base is setting with all four feet touching or they will fall off when the base gets hot enough to solder the tubes. Take the Bunsen burner in one hand and point the tip of the burner inside of the tube where it rests on the base. Flatten a piece of wire solder, apply some soldering fluid, reheat and then apply the solder a little at a time, being careful not to smear it. Apply heat, flux and solder as the work requires. Use sufficient flux so that the solder will flow around the tube. Then go to the next tube without cooling the one previously soldered. When all is finished, allow the base to cool a short while before cooling with water.

The handle is made of 3/8-in. round rod with one end forged to a taper. File, polish with emery, and bend as desired. The lower end is threaded with a 1/8-in. pipe die. Turn on a lock nut, then put the end through the base and place another lock nut on the bottom. A little solder flowed into this assembly will hold it more securely. The assembly is now complete.

Before applying the finish, pickle the holder for a few minutes. Then apply the oxidized finish. If copper is used, barium sulphide will oxidize it quite readily. If brass is used, butter of antimony will do the work. After the oxidation, wash thoroughly and dry. Apply steel wool to get the desired affect. A good rubbing with wax will retain the finish for quite a while.

12-FT. PADDLE BOARD

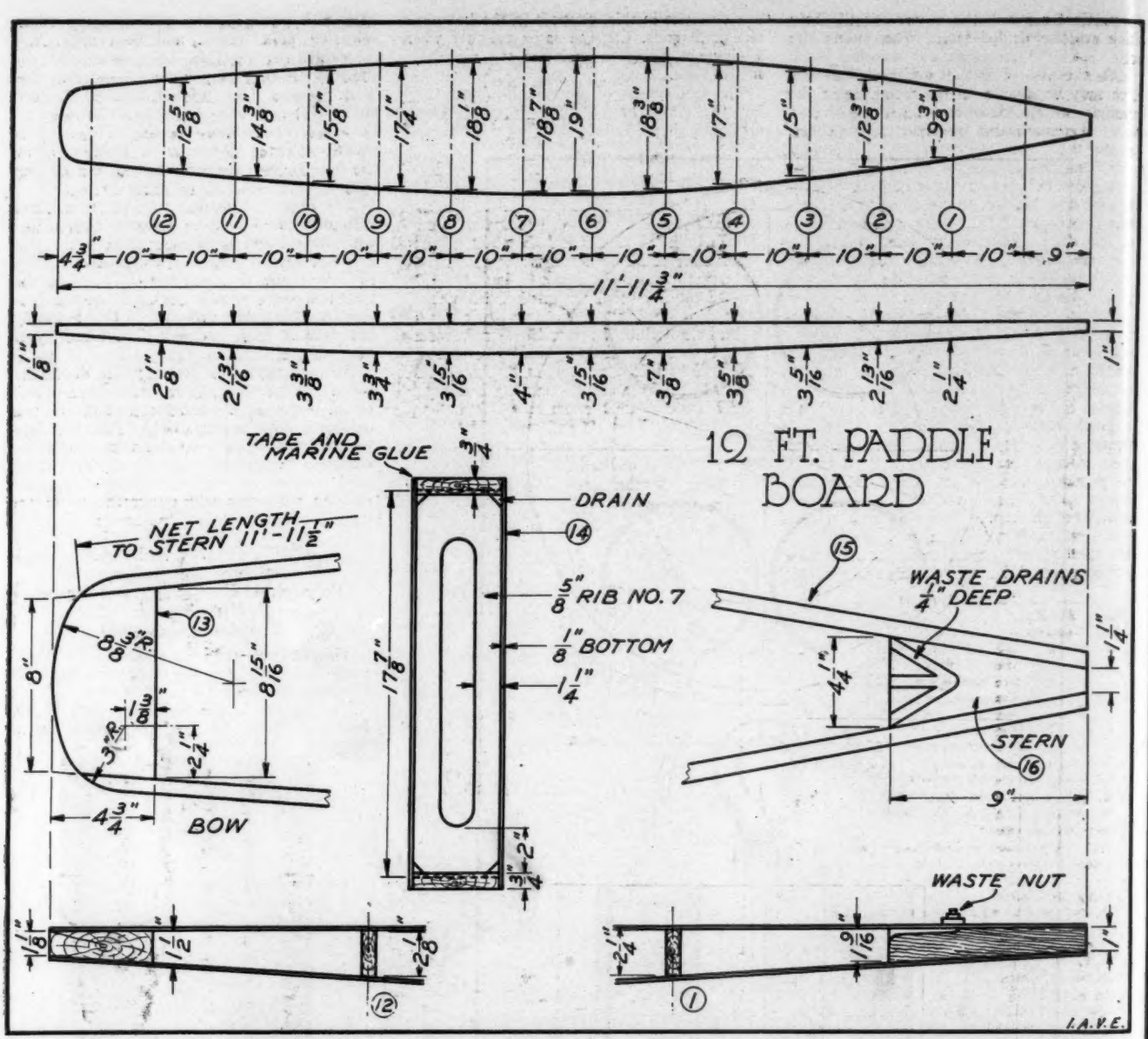
James McGregor,
Polytechnic Elementary and Junior High School,
Pasadena, California

This project has been designed for ninth-grade students, and presents some very interesting problems.

The paddle board has been used at the Southern Pacific beaches by lifeguards as an

The paddle board

aid to lifesaving, when bathers or swimmers get overtired and exhausted, and find themselves in difficulties. By the use of this board a lifeguard can reach a person in the water in double quick time, and many times save a life, due to the remarkable speed with which the board can be launched and propelled over the waters.



Apart from lifesaving, many happy and joyous hours may be spent with a paddle board. For those who live at or near a coast town, there is the fun of riding the breakers, while for those who prefer the lakes there is also the fun of paddling. You do not require to carry any oars with you, because you simply lie in a prone position, and paddle with your hands, taking long sweeping strokes. Another method is to kneel on the board, bending the back forward at each stroke of the arms. One very interesting phase of the paddle board is to have paddle board races. For the boy who is fond of swimming, and likes to be like a fish on the warm summer days, a paddle board is an excellent project.

Lumber free of all defects is essential. To be sure of having the side boards free from shakes at the ends, 14 ft. lengths have been specified. The remaining balance of two feet may be used for ribs. Make the two sides, which taper from 4 in. at rib No. 7, to 1⅛ in. at the bow, and 1 in. at the stern. In making the bow and stern blocks, No. 13 and No. 16, of extreme importance is the beveling of the sides. Should errors occur, one side or curve of the finished job will have a greater curve than the other.

Clamping the two sides together, mark positions of all ribs, and of the bow and stern. At each rib on the sides a dado joint is cut ¼ in. deep. The sides, No. 15 are now screwed to the bow and stern blocks No. 13 and No. 16, and rib No. 7 placed in position during assembly. Other ribs may now be made and fitted in place, and some of those will require a slight bevel on the ends so as to fit well into the dado on the sides. Measurements shown in the plan of the drawings, are to the outside lines of the board. To obtain true length of each rib, deduct 1 in. from the length given in the plan. Casein glue and galvanized nails will hold the ribs in place, using a clamp to pull the joints tight. Preparation of the edges of the sides and ribs to receive the top and bottom is next in order, and considerable care is required here, so as to have close fitting joints, remembering that these joints have to be watertight. At the four corners of each rib a small triangular drain is cut. Waste drains in stern are also cut. The bottom sheet of prestwood should be clamped in place, marked to size, and trimmed to shape, allowing ⅛ in. on each for a final finish after fastening. The edges of the sides are then coated with marine glue, a layer of tape applied, and another coating of marine glue on top of the tape. Holding the bottom in place with clamps, start nailing in place at the center working toward bow and stern. Fasten with 3d galvanized nails placed from ¾ to 1 in. apart.

Before fastening the deck in place give the inside surface two coats of paint, likewise the inside of the paddle board. A hole for the waste nut is also bored in the deck before fastening. Waste nut should be calked with a little marine glue or white lead before installing. Smooth and sand all round sides, bow and stern, rounding all sharp edges slightly. The top and bottom, because it already has a fine smooth finish, needs no sanding.

The job is then ready for painting, and special note should be made of thinning the priming coat with turpentine, and brushing out this coat specially well, because the nature of prestwood prevents much penetration

of paint. Sand between coats of paint and allow ample time for drying. This finishes the job.

Other types of covering for bottom and deck may be used in place of prestwood. For example in an effort to lighten the board, ¼-in. water-resisting plywood may be used on the deck, and prestwood on the bottom.

Or inexpensive ¼-in. plywood may be used for bottom and deck, and covered with canvas. In this case, the canvas would go on in two pieces, one for bottom and sides, and one for the deck, using a half-round molding to cover the seam, at the edge of the deck.

Still another method is to use ⅜ by 4-in. spruce planking, for bottom and deck.

The latter method is a superior type of construction, but involves more work than the time in many school programs will allow. The boards used for planking require beveling on the edges, so as to allow room for cotton packing in the joints, with calking compound to finish flush with the surface. To prevent springing of joints at seams, brass screws are more efficient than nails as a fastening for the planking. Because this requires the addition of quite a large number of screws which also add to the weight, and because it requires more time and skill to make a good job of this method of construction, planking does not seem justified for junior-high-school boys.

Bill of Material

Part No.	*No. Required*	*Material*	*Size*
1 to 12	1	S4S straight-grained spruce	⅝" x 4" x 14'
13	1	S2S mahogany	1¾" x 5" x 1'
14	2	Tempered prestwood	⅛" x 20" x 12'
15	2	S4S straight-grained spruce	¾" x 5" x 14'
16	1	S2S mahogany	1¾" x 5" x 1'

16 f.h. brass screws No. 8 by 1½"
2 lb. galvanized finish nails 3d
17 yd. white cotton tape, ⅝" wide
¼ pint marine glue
1 part ready-mixed outside white paint
1 quart airplane spar varnish
2 lb. japan of desired color (not dry color)

Painting specifications:

1st coat white thinned with turpentine
2nd coat white
3rd coat airplane spar varnish plus japan color, 1 lb. to 1 pint
4th coat airplane spar varnish plus japan color

Extra materials if job is canvased:

1 pc. double-filled white duck canvas 10 oz.—36" x 4 1/6 yd.
1 pc. single-filled white duck canvas 8 oz.—29" x 4 1/6 yd.
2 pcs. half-round white pine molding, ¼" x ⅝" x 12'
1 pc. strip brass 24 gauge x ⅝" x 1'6"

Painting specifications for canvas job:

This may also be used for a prestwood-covered paddle board, for those who prefer to mix their own paint.

8 lb. white lead soft paste
1½ pints pure turpentine
1 pint spar varnish
½ pint liquid drier

The above formula will make ½ gallon of paint.

For coloring add the following:

Light blue, ¼ tube deep blue to ½ gallon
Light green, 1/16 pint chrome green to ½ gallon
Yellow, ⅛ pint chrome yellow to ½ gallon
Light gray, ⅛ tube lampblack to ½ gallon
Buff, ⅛ pint raw sienna to ½ gallon
1st coat use above formula thinned with turpentine
2nd coat use above formula without thinning
3rd coat japan color thinned with airplane spar varnish, and just enough turpentine to make the paint brush out smooth (one pint of japan color to one pint of varnish)
4th coat repeat as for coat 3

SAFETY-ZONE LINES

Eugene W. Frank and Richard E. Burau, Washington Junior High School, Jamestown, New York

The industrial-arts teachers in their opening lessons, in particular, frequently stress the safety aspect in the school shop.

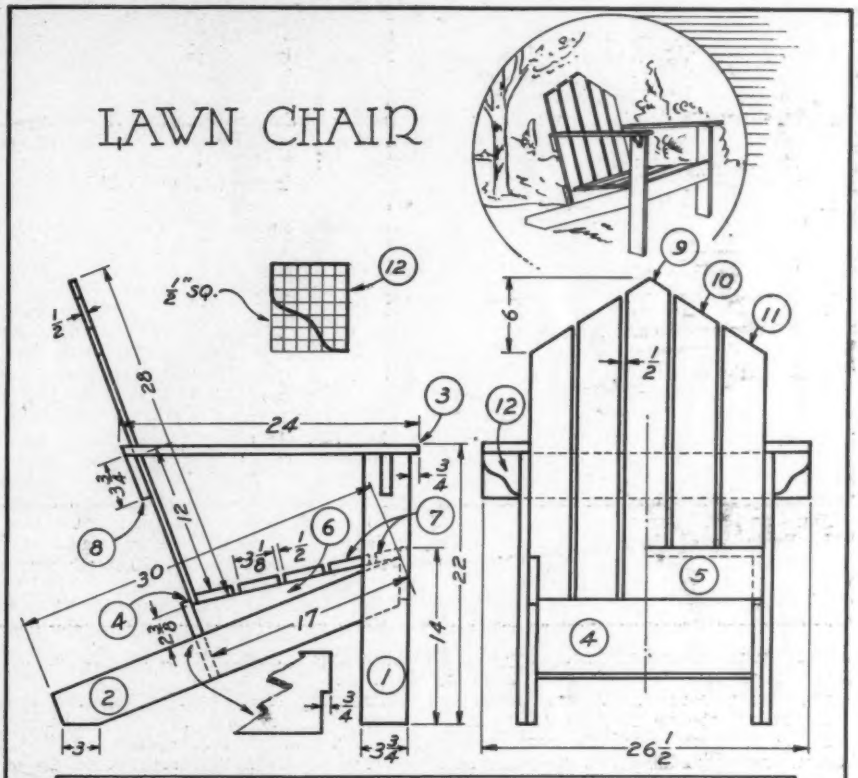
It was found advisable for a student operating a machine such as a grinder, a lathe, a drill press, a jointer, or a band saw to have plenty of room, and to be safeguarded against crowding and bumping by the other boys. This is an important safety precaution because even a slight bump may prove harmful to a student working on a circular saw.

Safety-zone lines on floor

Recently we began to use a new safety device to insure plenty of room and freedom for a machine operator in the junior high school. This safety precaution consists of red lines painted on the floor, around all machines, thereby forming *safety zones* in which only the operator of the machine is allowed.

These lines, painted on the floor, are 1½ in. wide. The placing of them is determined by having a large boy assume a working position at a machine while a chalk line is laid out around him. The line is then painted on and adequately protected while it is drying.

It has been found through experience that lacquer makes a better line than enamel since it seems to adhere closely and does not wear off as quickly as enamel. Carmel, or some other shade of red, works best.



MATERIALS				
NO.	PCS.	SIZE	MATL.	NAME
1	2	¾ × 3¾ × 22	PINE	FRONT LEGS
2	2	¾ × 3¾ × 30	"	BACK LEGS
3	2	¾ × 3¾ × 24	"	ARM RESTS
4	1	¾ × 6¾ × 20½	"	BACK STRETCHER
5	1	¾ × 4 × 19	"	FRONT STRETCHER
6	2	¾ × 2⅜ × 17	"	SEAT RISERS
7	5	¾ × 3⅛ × 19	BIRCH	SEAT SLATS
8	1	¾ × 6¾ × 26½	PINE	BACK STRETCHER
9	1	½ × 3⅜ × 28	"	BACK SLAT
10	2	½ × 3¾ × 26	"	BACK SLATS
11	2	½ × 3¾ × 24	"	BACK SLATS
12	2	¾ × 3 × 3½	"	ARM REST BRACKETS

USE NO. 9 - 1½" F.H. SCREWS ⤳ PAINT A BRIGHT COLOR.

Submitted by Oscar Embretson, Gaylord Public School, Gaylord, Minn.

TEACHING AIDS IN SAFETY

Wayne P. Hughes,
Eastern Illinois State Teachers College,
Charleston, Illinois

The following aids may be obtained free or for a nominal sum from the firms, clubs, associations, cities, or states mentioned in the list. The list has been carefully checked and it is hoped will be found very helpful. Shop teachers should remember, however, that while much of this material is sent gratis to teachers, nevertheless its production has cost considerable money to those who are furnishing it. For that reason it is no more than right that enough postage to cover carriage charges should accompany each request.

"The Automobile: Its Province and Its Problems," Vol. 116, N'24, 50 cents, paper binding, $1. Cloth. American Academy of Political and Social Science, 3457 Walnut St., Philadelphia, Pa.

"Sportsmanlike Driving Textbook"; Sportsmanlike Driving Series Text Pamphlets: "The Driver," "Driver and Pedestrian Responsibilities," "Sound Driving Practices," "Society's Responsibilities," "How to Drive"; "Training New Drivers"; "Use of Accident Records"; "AAA Safety Responsibility Bill"; "First Engineering Steps to Improve the Traffic Situation"; "Express Highways"; "Traffic Safety"; "Looking Ahead at the Traffic Problem"; "Traffic Problems and Their Relationship to School Plant Development"; "Normal Safe Approach Speeds at Intersections"; "Project on Traffic and Driving Knowledge"; "Pedestrian Protection"; "Standardized Tests for Sportsmanlike Driving Series"; "Testing Devices for Schools"; "Driver Rating Manual" (nominal costs). Local AAA Motor Club.

"Rules of the Road," 10 cents, American Council on Education, 5835 Kimbark Ave., Chicago, Ill.

"The Man at the Wheel — 100% Driver" (free), American Mutual Liability Insurance Co., 142 Berkeley St., Boston, Mass.

"Abridged Textbook on First Aid," 60 cents, American Red Cross, Washington, D. C.

"The Evolution of Highway Traffic" (free), American Road Builders Assn. (National Press Bldg.), Washington, D. C.

"Highway Transportation" (free), Association of Childhood Education, Washington, D. C.

"Automobile Facts and Figures" (free), Automobile Mfgrs. Assn., 336 Madison Ave., New York, N. Y.

"Student Patrol Handbook" (free), Better Traffic Committee, 908 City County Bldg., Pittsburgh, Pa.

"Bendix-Feragen Safety Equipment Catalog," 15 cents, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

"Automobiling," 20 cents, Boy Scouts of America, Chicago Service Station, 231 S. Green St., Chicago, Ill.

"School Safety Court" (free) (only in northern third of Indiana and northern two thirds of Illinois), Chicago Motor Club, 66 E. South Water St., Chicago, Ill.

"Manual for Vehicle Operators" (free), Com-

"Guides to Traffic Safety" (free); "Uniform Vehicle Code" (free); "Model Traffic Ordinances" (free), Federal Works Agency, Public Roads Administration, Washington, D. C.

"Charts on How Engine Works"; "We Drivers"; "How to Park in a Tight Place"; "Automobile Buyers Guide"; "When the Wheels Revolve"; "Chemistry and Wheels" (free), General Motors, Customers Research, Detroit, Mich.

"Care of the Car," 10 cents, Haskins Information Bureau, Washington, D. C.

"Safety Lessons for Each Grade" (free), Highway Education Board, Washington, D. C.

"Preventable Accidents," free in small quantities, 4 cents each in large quantities; "Children's Fire Prevention Lessons Booklet," free in small quantities, 1½ cents in large; "Children's Safety Lessons Booklet," free in small quantities, 3 cents each in large; "Driver's Handbook," limited distribution, free, Lumbermen's Mutual Casualty Co., Mutual Insurance Bldg., Chicago, Ill.

"Calling All Drivers"; "Safe Walkers Memo Book"; "First Aid"; "Industrial Safety Education in Schools"; Health Bulletin for Teachers — "Safety in Home, School and Community," with inserts of bulletins for boys and girls and parents (free), Metropolitan Life Insurance Co., Welfare Division, 1 Madison Ave., New York, N. Y.

"Guide Book for Safety Education," 15 cents; "Safety Education in the Elementary Schools," 60 cents; "Positive vs. Negative Instruction," 60 cents; "Man and the Motor Car," $1; "Safety Program for High Schools," free; "Teachers Manual," 15 cents, National Conservation Bureau, 60 John St., New York, N. Y.

"Safety and Safety Education: An Annotated Bibliography," 25 cents; "Checklist of Safety and Safety Education," 25 cents; "Safety Education Through Schools," 25 cents; "Safety in Pupil Transportation," 25 cents, National Education Association, 1201 Sixteenth St., N.W., Washington, D. C.

"Highway Transportation" (free), National Highway Users Conference, Washington, D. C.

"How Long on the Highway," 25 cents; "Reports of the Committee on Pedestrian Problems," 15 cents; "Accident Facts," 50 cents; "Examining Applicants for Drivers Licenses," 25 cents; "Bibliography of Safety Material," 15 cents; "Junior Safety Council," 35 cents; "Safety for Supervised Playrounds," 25 cents; "Safety Training for Vocational Schools and School Shops," 50 cents; "Safety Education in the Rural School," 35 cents; "Safety Plays," free, National Safety Council, 20 North Wacker Drive, Chicago, Ill.

"Road to Safe Driving," free (limited quant. left); "First Aid Manual," free, Northwest Casualty Co., 217 Pine St., Seattle, Wash.

"The Automobile User's Guide" (free), Pontiac Motor Division, Pontiac, Mich.

"The Skillful Driver," free in limited quantities, Royal Indemnity Co., 150 William St., New York, N. Y.

"Safety for the Household, C-397," 25 cents, Superintendent of Documents, Government Printing Office, Washington, D. C.

"Highway Hazards — Their Cause and Cure," free; "Smash Hits," free, Travelers Insurance Co., Hartford, Conn.

"Keep Headlights in Good Condition" (free), Travelers Standard, Travelers Insurance Co., Hartford, Conn.

"Reports on Fatal Traffic Accidents" (free), U. S. Bureau of Census, Washington, D. C.

"Summary of Accident Investigation Report," 10 cents, U. S. Printing Office, Washington, D. C.

"Compulsory Automobile Safety Inspection" (free) (limited supply), Weaver Mfg. Co., Springfield, Ill.

"Suggested Course of Study for a Class in Automobile Driving" (free), Department of Public Instruction, Phoenix, Ariz.

"The Regulation of Pupil Transportation" (free) (distributed only in State of California), Department of Education, Sacramento, Calif.,

"Cause and Prevention of Traffic Accidents," 10 cents, Administration Bldg., 414 Fourteenth St., Denver, Colo.

"Motor Vehicle Laws" (free), Division of Highways, Springfield, Ill.

"Safety Education" (free) (edition limited), Board of Education Hammond, Ind.

"Common Traffic Problems" (free), Dept. of Public Instruction, Des Moines, Iowa.

"Transportation of Public School Pupils in Massachusetts" (free), Dept. of Education, Boston, Mass.

"An Elective, Non-Unit Course in Automobile Driving" (free), State Motor Vehicle Dept., Concord, N. H.

"Pupil Transportation in Rural New York, Bulletin 950," 5 cents, University of the State of New York, Publications Bureau, Albany, N. Y.

"Health and Citizenship Education," 10 cents, Dept. of Public Instruction, Raleigh, N. C.

"Safety Education in Public Schools" (free), Board of Education, Harrisburg, Pa.

"Motor Vehicle Code Digest," free; "Examination Blank for Operators License," free; "Accident Report Blanks," free; "Monthly Accident Reports," free, Bureau of Motor Vehicles, Dept. of Revenue, Harrisburg, Pa.

"Outline Course of Study in Safety Education" (free), Board of Education, Providence, R. I.

"Outline for Teaching Safety for Elementary Schools" (free), Dept. of Public Instruction, Nashville, Tenn.

"Safety Education Course of Study," 10 cents, Dept. of Public Instruction, Salt Lake City, Utah.

"Safety Education," 30 cents (limited distribution), State Dept. of Education, Montpelier, Vt.

"Facts You Need to Know to Be a Safe Driver" (free), Division of Motor Vehicles, Richmond, Va.

"Teachers Manual in Safety Education," 50 cents, Dept. of Education, Charleston, W. Va.

"Health Education Including Safety" (free), Dept. of Public Instruction, Cheyenne, Wyo.

FLYING BAMBOO

Terence Vincent,
Ypsilanti, Michigan

Bamboo window shades, parasols, and fishing poles may all have their influence on miniature aircrafters. The bamboo salvaged from discarded objects such as those mentioned, may be used to make repairs on broken balsa-wood skycraft, reinforce weak parts, build complete parts, and even entire airplanes. Bamboo also is useful in the construction of kites, a fact well known to Oriental kite makers.

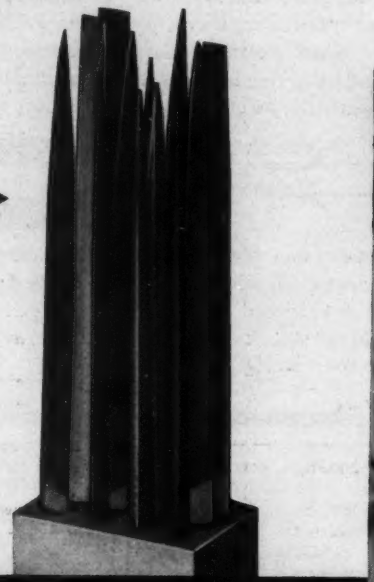
Bamboo Repairs

When David Cummings, one of the champion fancy divers of Michigan high schools, broke the nose of his fragile monoplane, bamboo came to the rescue.

The splintered balsa longerons were removed with tweezers. The paper covering was completely taken off where it was too wrecked for further use. Then little splinters of bamboo, measuring perhaps 1/20 in. square, and several inches long, were cemented to the

(Continued on page 14A)

It's files like these that put the breath of life into things like this



It's those delicate last touches — the freeing of a moving part, the smoothing of a rubbing surface, the widening of a slot, the rounding of a pin — that eventually make a well-conceived working model "click."

The successful craftsman needs an assortment of precision files . . . *good* files that bite cleanly, finish smoothly. . . . Files for holes, square and round; files for grooves and notches; files for curved and flat work. He needs them quite as much as his tap-and-die outfit, his kit of drill points, his set of wrenches.

Nicholson — world's leading file works — makes precision files that are the artisan's pride. They're the Nicholson X.F. Swiss Pattern Files — in shapes and tooth-cuts variously suited for metals, woods, plastics and other materials.

Our booklet describing many types of Nicholson Files and their uses is free for the asking. Use the coupon below. Your supply house has or can get any Nicholson File for you.

NICHOLSON FILE COMPANY, PROVIDENCE, R. I., U. S. A.
CANADIAN PLANT, PORT HOPE, ONT.

NEW — NICHOLSON TWO-FILE SPECIAL
during National Hardware Open House—April 25 through May 4. A handy-man's 8-inch mill and 6-inch extra-slim taper, with handles, in box. (In many sections, available also in Black Diamond brand.) Suggest to your students that they buy it for home use. *Bargain price*—40c (regular value, 63c). At hardware dealers.

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Practically Indestructible

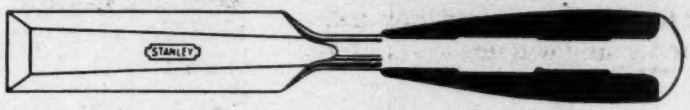
STANLEY
"BOY PROOF" CHISELS

A "Boy Proof" Stanley Chisel is built to stay together. The handle surrounds the single piece of steel which extends from tip to tip, eliminating trouble due to lost or broken handles.

The blades are of the finest steel, tempered with newest heat-treating methods, producing keen cutting edges—edges that stay sharp. A chisel that fits the hand and has a fine balance. Write for catalog 34 describing the full line of Stanley "Boy Proof" Tools.

No. R-40 . . . special rubber composition handle, formed under heavy pressure. Fills in the specially designed recesses on the shank to make a handle practically impossible to loosen. Twelve blade widths: 1/8" to 2".

STANLEY
TRADE MARK



This cutaway view shows the everlasting construction of Stanley Chisels. The head, shank, ferrule and blade are forged complete — no mechanical joints. A blow struck on the head is transmitted directly to the cutting edge.

STANLEY TOOLS
Division of The Stanley Works
EDUCATIONAL DEPARTMENT, NEW BRITAIN, CONN.

(Continued from page 176)

body parts. The front ends, of course, were inserted into the new nose block.

After the cement on all new parts had thoroughly dried, the airplane was again ready to fly, and it could withstand the bumps against walls and other obstructions without much danger of being broken again.

Experienced miniature aircrafters have utilized bamboo for years. The newer generation, however, has little or no experience with this resilient, tough wood.

When wing edges crack, or tail edges break, a little stick of bamboo cemented to the desired place, held there till dry, does the work very well and unobtrusively.

Landing gears may well be made of bamboo. This wood absorbs the shock of sudden or of gentle landings, yet springs back to shape when the stress and strain has passed.

When a longer piece of bamboo breaks entirely in two, the pieces may be lap spliced together easily. It is best, however, to tie these joints with silk thread in cement. Balsa, when thus broken, may be securely repaired by cementing a piece of bamboo in a slot cut into each of the broken ends.

Bamboo Parts

Sometimes complete parts may be made from bamboo. This wood may be bent to shape either by heating it or by soaking it in water. Then it is bent to form after which it must be allowed to dry thoroughly. Almost any requirement in curvature may be satisfied. One expert in Chicago tied an artistic bow knot, with a bamboo strip of uniform cross section. Artistry comes with skill and intelligent practice.

Commonly, rounded bamboo is used for tail tips, wing tips, and for airplane landing gear.

In pusherplanes, bamboo strips may be used as the crossbraces for elevators, and for the entire wing frames.

When splicing two pieces of wood with a bamboo splinter, "feather" the edges of the ends which are to be cemented into the other wood, for if left smooth, they are likely to pull out.

A single-stick aircraft can be made of bamboo, with wing, elevator, and fin (or rudder) and even the propeller frame, all of bamboo.

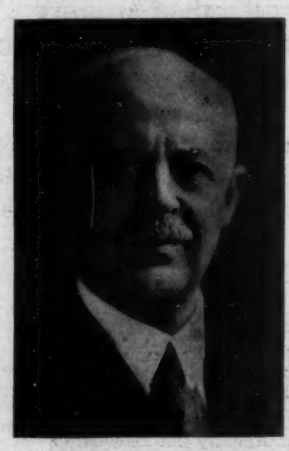
Personal News

Dr. Robert L. Cooley Resigns

On April 1, 1940, Dr. Robert L. Cooley, the Grand Old Man of vocational education in Milwaukee as well as in Wisconsin, will cease to be director of the Milwaukee Vocational School. His resignation came as a shock to those who know of his deep abiding interest in his school, of his vision of an education for a fuller and richer life for all who have left full-time school, and of the superb driving energy which made his dreams for the education of minors and adults, come true.

At times one wishes worth-while leaders would remain forever young. Since this cannot be, we must bow to the inevitable and sadly watch men like Dr. Cooley lay down the job which they have so ably carried on. But we can do more, and that is to express the wish that this competent worker, this profound philosopher, will have the health and the time to enjoy with his wife and family many happy years to make up for those that had to be spent in the harness developing and building up that great institution which will always be a monument to him.

Dr. Cooley was born on May 3, 1869, at Waubeca, Wis. He received his teacher training at the Oshkosh Normal School. Having finished that, he taught rural school in Ozaukee County,



Dr. R. L. Cooley

Wis., and later was appointed superintendent of schools at Oconto, Wis. At Milwaukee he held the principalship at several elementary schools, and in 1912 was appointed director of the Milwaukee Continuation School. How well he occupied this position ever since is common knowledge.

In accepting his resignation, the Board made him Director Emeritus of the splendid institution which he founded, and they, as do all of his many friends, hope that he will be granted many years in which to enjoy his well-earned leisure.

(Continued on page 16A)

WALKER-TURNER MACHINE TOOLS

...the logical selection for schools

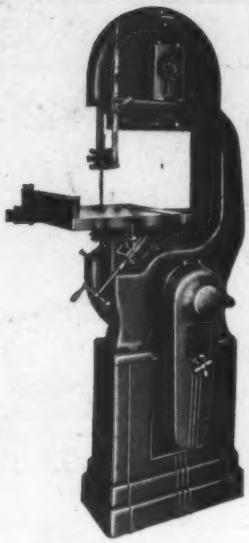
Walker-Turner Machine Tools meet every school requirement . . . safety, accuracy, durability, simplicity, and economy both in first cost and in operation. Because there are thousands of these tools in daily use in all branches of industry, your students are likely to be called upon to use them when they enter the industrial world. It will be a great advantage to them if they have learned their trade on the tools they will use to earn their living.

Walker-Turner Machine Tools include Drill Presses, Band Saws, Bench Saws, Tilting Arbor Saws, Jig Saws, Radial Saws, Jointers, Belt and Disc Surfacers, Spindle Shapers, Lathes, Grinders, and Flexible Shaft Machines. Large scale production and sound engineering design permit manufacturing economies that are passed along to the user in a low price that offers an unusual investment opportunity for the alert buyer. This is of particular advantage where the needs are large and the appropriation limited.

The 16" Band Saw shown in the upper illustration to the right provides a speed range of 50 to 2500 f.p.m. with back gearing and cone pulley. This exceptionally wide speed range makes it suitable for cutting many materials, from tool steel and ferrous metals to wood, bakelite, aluminum and non-ferrous metals.

The Floor Model Drill Press is one of several models manufactured by this Company, all noted for smooth-running accuracy. Six-spline spindle minimizes vibration. Four precision ball bearings. Foot feed available at slight extra cost.

The new 10" Tilting Arbor Saw gives full 3" depth of cut. Angle cuts to 45° through 2" stock on level table. Plenty of room in front of blade. A sturdy, accurate, dependable shop tool.



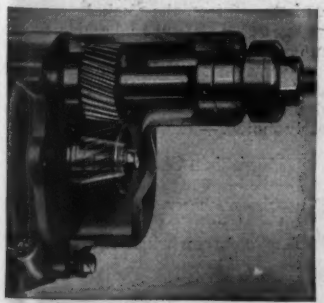
MBN1105 16" Band Saw as shown including belt guard, belt and motor pulley, less rip fence and motor $156.00

D636 Floor Model Drill Press with belt guard and production table, standard speed, less motor $54.75

WALKER-TURNER CO., INC.

1940 BERCKMAN STREET - - - - PLAINFIELD, N. J.

CHOICE OF GEARED MOTOR OR TEXROPE DRIVE



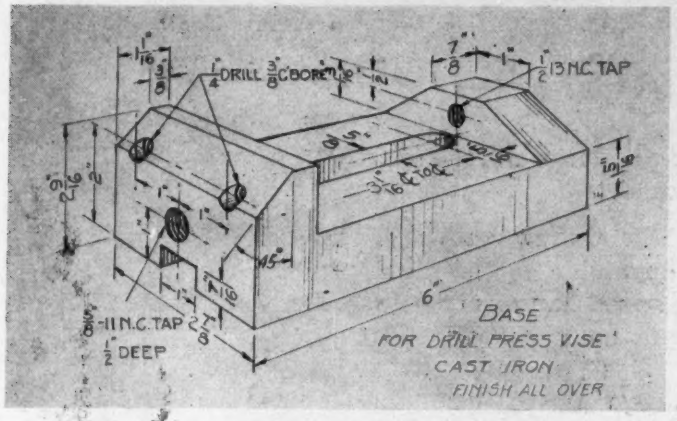
The Walker-Turner Shockproof Geared Motor cannot be damaged by sudden shocks. A cone clutch in one gear relieves strain and instantly resets itself. Undoubtedly most dependable type of drive yet developed.

Allis-Chalmers Texrope Drive, employing three belts and three-groove pulleys, is available for those who prefer a belt drive machine. Quiet, smooth, with ample overload capacity.

TA1180 Tilting Arbor Saw with 1 H.P. Geared Motor, less extension tables $134.00

walker-turner

CLASSROOM PROBLEM No. 4



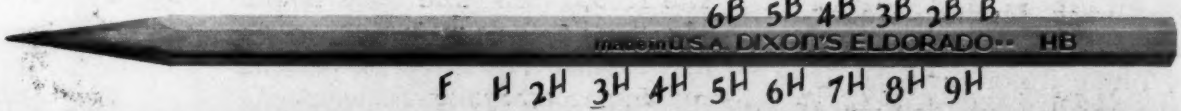
Drawn with Typhonite Eldorado using degrees 2H and 3H.

PROBLEM: *Ask your students to draw the correct orthographic views of this base for drill press vise.*

SOLUTION: *For your convenience you can get a free blueprint or black and white showing the problem's solution. Ask for blueprint No. 128-J4.*

HAVE you "discovered" Typhonite Eldorado Pencils? If not, you're missing something—you're missing Typhonite Eldorado's clean, opaque lines, so ideal for blueprinting—their stronger points—their accurately graded degrees.

Put Typhonite Eldorado Pencils to the test, won't you? The secret of their quality lies in Typhonite, a new form of natural graphite. It consists of extremely minute particles of just the right size, produced by a whirlwind or typhoon of dry steam. Typhonite leads are exclusive with Dixon so no other pencil can be like Typhonite Eldorado.



SCHOOL BUREAU, JOSEPH *Dixon* CRUCIBLE COMPANY, JERSEY CITY, N. J.

(Continued from page 14A)

♦ The resignation of Fred L. Curran, supervisor of student teachers at The Stout Institute, Menomonie, Wis., came as a surprise to faculty and student body alike.

He was born in Marquette County, Wis., in 1879. It was here also that he attended rural school. He qualified for a teacher's certificate by studying in teachers' institutes and at summer sessions. In 1905 he obtained a diploma from the Stevens Point Teachers College and another diploma from The Stout Institute in 1908. This institution also conferred on him the B.S. degree in 1921, and he received his M.A. degree from the University of Minnesota in 1934. He also took summer-school work at Bradley Polytechnic Institute, and at Columbia University.

His teaching experience covers five years of rural school teaching, two years as principal at Bundy, Wis., and thirty-two years at The Stout Institute as teacher of many subjects, and as supervisor of student teachers.

From 1918 to 1929 he also acted as director of the Menomonie Vocational School.

Mr. Curran's tentative plans for the year embrace travel through the eastern and southern states.

♦ WALTER B. JONES, for the past four years associate director of the Bureau of Public Instruction and chief of the Division of Industrial Education in the Pennsylvania State Department of Public Instruction has been appointed assistant professor of education in the School of Education of the University of Pennsylvania, Philadelphia. He has been assigned to the staff in Vocational Teacher Education. Dr. Jones was for some time professor of industrial education at the University of Pittsburgh.

♦ Mr. S. Lewis Land, supervisor of industrial education and industrial teacher training at the University of the State of New York, Buffalo, and chairman of the Vocational Service Committee of the Rotary Club of Buffalo, has started a series of twenty-six weekly radio broadcasts as a part of the vocational-guidance program set up by Buffalo Rotary.

Answers to Questions

Boiled Linseed Oil and White Lead

1056. Q.: What is the best-known carrier for white lead as a primer? Which will furnish the best bond? Is the addition of turpentine beneficial or harmful to the prepared paints? Kindly give in brief the best method of finishing exterior work.—*A. V. L.*

A.: Boiled linseed oil, as made by Spencer-Kellogg Company of Buffalo, N. Y., or Dutch Boy Brand of the National Lead Company is the best vehicle for white lead as an outside paint, whether used as a primer or in the finish coats. The National Lead Company puts out an envelop made up especially for Master Painters, but which the Company will be glad to send you in making up paints, matching colors and doing decorating in general. Turpentine should be used as recommended in the National Lead Company painting guide to perform a most necessary work of bonding the paint with both the new surfaces whether wood or second coats. I seriously doubt the practice of using petroleum substitutes in place of genuine turpentine since I have been able to prove a large number of paint failures were caused by the use of substitutes. For finishing exteriors, follow carefully the specifications of the National Lead Company handbook for Master Painters.—*Ralph Waring.*

Shellac Troubles

1057. Q.: Within the past two or three years I have been having trouble with shellac. I find that in sanding the shellac with sandpaper or steel wool, it "piles up" on the sandpaper or in the steel wool, instead of sanding off in a white powder as formerly. I have attributed this condition to the use of "Solox" or some of the new substitutes for denatured alcohol which have come into rather common use during the past two or three years. As I recall it, while I was using denatured alcohol as a thinner in my shellac, it dried hard within twenty-four hours and when sanded, the shellac came away as a fine white powder.

For the past two years, the company which has been filling our requisitions has informed me that they are unable to secure denatured alcohol and in their own work use "Solox" only. Will you please inform me whether my experience with the new solvents for shellac is unique or whether others have had the same trouble and how I may correct my procedure, if possible, to get better results? Can you inform me where I may secure denatured alcohol instead of the new type of thinners?—*E. G. B.*

A.: There is absolutely no reason why your shellac supplier cannot get the proper grade of denatured alcohol No. 1 for cutting shellac. The use of Solox for this work is not to be recommended for the several reasons you have outlined. As a matter of fact, the alcohol for shellac work is the easiest one of all to be able to buy on the open market or on quotation. My personal idea is that something other than alcohol in your shellac is to blame for this condition. Denatured alcohol may be obtained from your nearest supply house.—*Ralph Waring.*

Finishing Cherry

1062. Q.: I would like to know the best method of finishing cherry. What color stain should be used and in what proportions? I do not like the blood-red color which is often applied to this wood.—*A. E. J.*

A.: If you do not like too much red in your cherry finish, use a 2-oz. solution of potassium dichromate in a gallon of water. Later a very weak stain of 1-oz. red per gallon may be laid over the dried first coat. This procedure may also be reversed since in this manner it is possible to get brown over red or red over brown

(Continued on page 19A)

"Johnny, your work is 100% better since you're using Douglas Fir Plywood!"

● Douglas Fir Plywood is such a sturdy lumber that students can give it all kinds of punishment, yet their projects will turn out neat and attractive. Douglas Fir Plywood combines great strength, with large size, too. It is made in convenient sizes up to 4 feet by 8 feet and in a variety of thicknesses. It works easily with all tools . . . holds nails and screws at the edges without splitting . . . and can be jig-sawed into intricate shapes without breaking. It comes sanded satin-smooth, ready for any finish.

There's a grade of Douglas Fir Plywood for every purpose. Teach your students the difference in the grades and show them how every panel can be quickly and accurately identified by its "grade trade-mark." If your stockroom doesn't contain a good assortment of Douglas Fir Plywood, order now. It's handled by all recognized lumber dealers.

There's a grade of Douglas Fir Plywood for every project!

☆ ☆ ☆

PLYPANEL

The grade of Douglas Fir Plywood for fine cabinet work, cut-outs, paneling — every project where both sides of the plywood are to be finished and exposed to view.

PLYWALL

The wallboard grade of Douglas Fir Plywood. Use it for display cut-outs, backs of cabinets, light shelves, partitions, etc., where only one surface must be perfect. Builds puncture-proof walls and ceilings.

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This grade of Douglas Fir Plywood is made with water-proof glues for permanent outdoor work such as garden cut-outs, siding, signs, bird houses, etc. Ideal for all types of boats.

PLYSCORD

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Excellent concrete form material. Serves as sheathing and lining combined. Gives smoother surfaces.

Write for this helpful literature

FOR LUXURIOUS LIVING — tells how to finish Douglas Fir Plywood. A very useful booklet.

CONSTRUCTION BULLETIN NO. 1 — includes plans for child's desk and bench set, clothes hamper, boudoir chest and seat and 9 other plans for plywood projects.

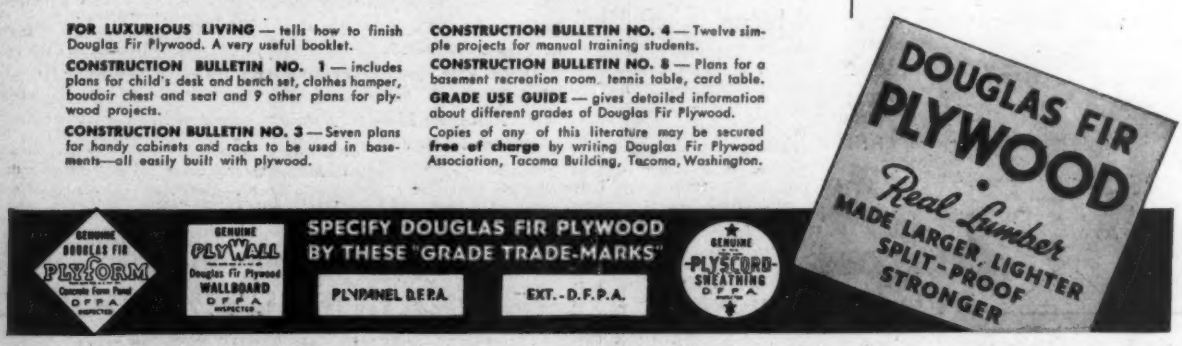
CONSTRUCTION BULLETIN NO. 3 — Seven plans for handy cabinets and racks to be used in basements—all easily built with plywood.

CONSTRUCTION BULLETIN NO. 4 — Twelve simple projects for manual training students.

CONSTRUCTION BULLETIN NO. 8 — Plans for a basement recreation room, tennis table, card table.

GRADE USE GUIDE — gives detailed information about different grades of Douglas Fir Plywood.

Copies of any of this literature may be secured **free of charge** by writing Douglas Fir Plywood Association, Tacoma Building, Tacoma, Washington.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GENUINE PLYWALL Douglas Fir Plywood WALLBOARD D F P A INSPECTED
SPECIFY DOUGLAS FIR PLYWOOD BY THESE "GRADE TRADE-MARKS"
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Total registration and tuition fees $16.00—No out of state tuition charged summer session students.

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Extensive summer recreation and entertainment program free to summer session students.

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William E. Warner, *Consulting Editor*

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* DIRECTORS! SUPERVISORS! INSTRUCTORS!—engaged in the field of Industrial Arts Vocational Education in the United States are all eligible to enter. Everyone has an equal chance. Neatness or fancy presentations will not be a deciding factor—only the reasons you give.

Follow These Simple Rules: 1) Write an essay of 250 words or less on "WHY I PREFER 'SOFT-TEXTURE' KILN DRIED LUMBER IN MY CLASSES" (See pages 18-19 of our Catalog No. 39); 2) Submit your entry (or entries) in sealed envelope marked "SOFT-TEXTURE LUMBER CONTEST"; 3) All essays will become the property of Brodhead-Garrett Co.; 4) In fairness to all, Brodhead-Garrett will not enter into correspondence with anyone in connection with this contest; 5) Contest will close May 1st and winners be announced in this magazine as soon as the judges make their decision.

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1st Prize	$100.00
2nd Prize	75.00
3rd Prize	50.00
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(all above are cash prizes)

5th, 6th, 7th, 8th, 9th, and 10th prizes—$10.00 each, in merchandise.

BRODHEAD-GARRETT CO. "Specializing in Soft-Texture Lumber and General School Supplies" Cleveland, O.

(Continued from page 16A)

in an effort to secure desirable undertones or overtones. A little experimenting along this line will enable you to work out a definite procedure suited to your individual taste—*Ralph Waring.*

Wearing Qualities of Shellac, Varnish, and Lacquer

1059. Q.: Will you kindly give me the comparative wearing qualities of shellac, varnish, and lacquer on furniture? I am looking for a finish that will stand a great deal of abuse.—*J. K. B.*

A.: Over a period of twenty-five years of testing finishes, I am still specifying a high grade of four-hour floor varnish as the best all-round finish for furniture. This in spite of the speed of shellac or lacquer finishes which so far are not able to compete with varnish in durability over an equal period of time. Temporarily, shellac and lacquer finishes look fine, but with a year or two of use begin to fail very rapidly indeed, all advertising to the contrary, notwithstanding. —*Ralph Waring.*

Tempering in Oil

Q.: How is tempering in oil done?

A.: A pot or container is placed in a suitable furnace. The color or tarnish tint method of determining temperatures cannot be used when tempering in oil as they cannot be observed. Therefore, some other method must be used to tell the temperature of the bath. Generally, a thermometer or pyrometer and thermocouple are used. When the correct temperature is reached, the furnace is shut off and the work left in the bath until heated all the way through, then cooled by cold quenching. When tempering continuously, the furnace must be automatically controlled, as even high-flash oil should not be used much above 550°, on account of danger of fire. If temperatures above this are required, use a lead or salt bath. (In these baths, the work must be free of moisture.)

New Publications

A.C. Motors of Fractional Horse-Power

By H. H. Jones. Cloth, 189 pages, 5 by 7½, illustrated. Price, $3. Published by the Chemical Publishing Co., 148 Lafayette St., New York, N. Y.

A book which describes the working principles of a.c. motors for the maintenance man as well as for those who work at the design and construction of small motors.

While this book is based on British practice, an insert gives simple directions for quickly and easily making the corrections required to adapt the information to commonly accepted American standards.

Machine Shop Work

By Turner, Perrigo, and Bertrand. Cloth, 412 pages, 5¾ by 8½, illustrated. Price, $2.75. Published by the American Technical Society, Chicago, Ill.

This is the revised, fifth edition of this very comprehensive and thorough text on machine shop practice. It covers both hand- and power-driven tools, and gives a very good explanation of modern production methods and production machines. It also contains a very good exposition on how to use the slide rule.

Industrial Electricity, Part I

By Chester L. Dawes. Cloth, 387 pages, 5¾ by 8¾, illustrated. Price, $2.20. Published by McGraw-Hill Book Co., New York City.

This new edition brings this old favorite text up to date as far as the newer materials, developments in production, and use of electrical instruments, manufacturing of things electrical, and newer adaptations of electricity to modern conditions, are concerned.

The order of the chapters have also been altered to make the material conform more readily to its use as a textbook in elementary electrical engineering.

The book contains 322 new problems.

The Game of Weaving

By Osma Couch Gallinger. Cloth, 110 pages, 7⅛ by 9¼, illustrated. Price, $1. Published by International Textbook Company, Scranton, Pa.

An exceedingly interesting book for the child beginning the study of textiles and weaving. The book is divided into 21 lessons. Starting with the story of thread, animal fibers, plant fibers, mineral fibers, and synthetic fibers, the children are led through the various lessons as though playing a game, learning how the Indians wove, how to make their own designs, and then how to use the small table loom in the production of real articles of use.

Handicrafts as a Hobby

By Robert E. Dodds. Cloth, 138 pages, 5⅞ by 8⅝, illustrated. Published by Harper and Brothers, New York City.

The author describes briefly but interestingly the following worth-while handicraft hobbies: leatherwork, cloth pictures, strip confetti, hand weaving, painting on glass, papier-mâché, annealed metal pictures, coconut carving, batik, metal flowers, block printing, greeting cards, crepe-paper craft, bookmaking, glass etching, bead craft, and place cards.

Illustrations and brief descriptions show how various kinds of projects can be made by those who have become interested enough to try out any one or more of the hobbies mentioned.

Arc Welding and How to Use It

By W. J. Chaffee. Cloth, 334 pages, 5¼ by 8¼, illustrated. Price, $1.50. Published by Hobart Bros. Co., Troy, Ohio.

This book was reviewed on page 17A, of the January, 1940, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Unfortunately, the publisher's address was not given correctly. We are glad to make this correction.

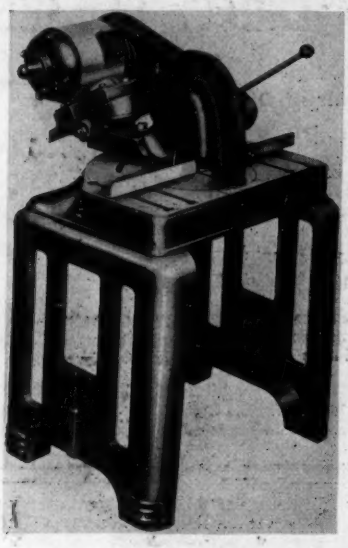
ADVERTISING PAGES REMOVED

SHOP EQUIPMENT NEWS

NEW PRODUCTS—PUBLICATIONS

New Improved Cut-Off Machine

An accurate, speedy abrasive cut-off machine, built according to best engineering practices and embodying important improvements, has just been announced by the Delta Manufacturing Company of Milwaukee. It will cut quickly and accurately to exact lengths such materials as steel, brass, copper, cast iron, monel metal, bakelite, and all plastic materials, pipe, wire rope, stellite, tool steel, manganese steel, fibrous material such as brake linings, tile, brick, carbon, porcelain, slate, hard rubber, concrete coping, and sand cores.



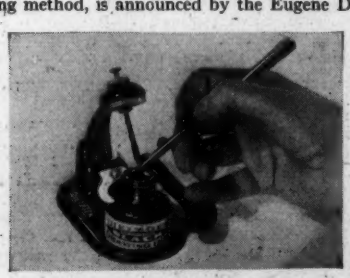
Cut-off machine

On metal it leaves the cut with a polished surface, thus eliminating many burring and finishing operations necessary where other cut-off methods are used. By switching to a saw blade this same unit can be used for cutting wood.

Some of the outstanding features of this rugged machine are: wide-spaced Timken roller pivot bearings and double-arbor sealed-for-life bearings requiring no lubrication — powerful Tex-Rope V-Belt drive — adjustable fence — accurately machined table. It is perfectly balanced, making for easy operation — cuts material at any angle and embodies unusual safety features such as husky chip guard and belt and wheel guards. It has a capacity up to 2 in. diameter, or material up to 2 by 6 in.

Handy Pen-Filling Inkstand

An inkstand for filling ruling pens which saves considerable time and ink over the usual hand-filling method, is announced by the Eugene Dietzgen Co., Chicago. The Handy Pen-Filling Inkstand consists of 3 parts; a stand which holds the regulation ¾-ounce bottle of ink; a rubber-stoppered dipper arm which closes the bottle tightly when not in use; and a finger-touch lever which raises a filling loop on the end of the arm from the bottle. When the draftsman wants to fill his pen, he simply lifts the ruling pen from his work, reaches out, presses the lever with his little finger and touches the pen nibs to the loop. The loop may be lowered or raised according to the level of ink in the bottle or to the amount of deposit desired. The stand is non-tippable and may be fastened to the drawing board.



Handy pen filler

New Stanley Grinder

Stanley Electric Tool Division, New Britain, Conn., have announced a new compact Grinder, No. 153, which is nicely balanced and designed for both hand and lathe grinding. With a motor holder, the grinder can be mounted in a lathe, milling machine, or shaper, for external or internal grinding on dies, punches, machine parts, spiral cutters, and the like.

Stanley grinder

The motor is a ⅓-h.p. direct-drive unit mounted on ball bearings and has ample power to drive grinding wheels up to 1½-in. diameter.

The extended shaft gives a reach of 5 in. for deep internal grinding and the long spindle housing provides a good grip for hand grinding.

This grinder will accommodate emery wheels, mounted points, and rotary files for hundreds of jobs.

Meltomatic Paste Solder

A new soldering product called Meltomatic Paste Solder, has just been introduced by Wayne Chemical Products Co., Detroit. It is a self-cleaning and self-fluxing paste solder that simplifies soldering and tinning operations. It requires no melting pot, soldering iron, or flux, because

The new paste solder

Meltomatic is brushed on the metal exactly where it is needed, and is then heated with gas or any other type of flame, electricity, hot oil, or in a furnace. It will melt at a temperature slightly higher than 400 deg. Fahrenheit. A lighted match is, therefore, sufficient to do the job.

In addition to expediting normal soldering and tinning work, it facilitates soldering of small articles where irons are usually difficult to manipulate, and it permits one to reach small spaces not accessible with ordinary solder stock.

At the present time, Meltomatic is being sold direct from the factory in quantities to satisfy the requirements of each particular case.

Chrome-Face Steel Tape

Chrome Face is the name of the line of steel measuring tapes that has just been put on the market by The Lufkin Rule Company. These tapes are entirely new and different from any others. Their markings are durable as well as easy to read.

They are accurate steel tapes, chrome plated, with jet-black markings and satin chrome-white surface, unusually free of glare. Hence, the permanent markings stand out in sharp contrast, showing up well even in poor or artificial light. Furthermore, being built up by chrome plating, these tapes are extra strong and resist rust. The surface is smooth, hard, and easy to clean, and the tape, being of metal throughout, will not crack, chip, or peel. New cases and frames of improved design and appearance have been built for this new line.

Chrome-face tapes in cases are now offered in two brands: "Anchor" in ⅜ in. and ½ in. width, in genuine leather case; and "Leader," the popular-priced line, ½ in. wide, in durable and attractive, imitation-leather case. Included also are Chrome Face ⅜ and ½ in. wide tapes on metal frames with plumb bob for tank gauging in the oil industry. The tape is available in 25-, 50-, 75-, and 100-ft. lengths.

Elmer C. Schacht Honored

Elmer C. Schacht, vice-president in charge of manufacture for Behr-Manning, Troy, N. Y., was awarded the title "Modern Pioneer" at a dinner given at the Waldorf Astoria in New York on February 27. This signal honor is conferred by the National Association of Manufacturers in celebration of the 150th anniversary of the founding of the American patent system.

The title, "Modern Pioneer," is only for those few who are considered to have made a most outstanding contribution, although it is open to nomination from among those who have "discovered or invented an art, machine, manufacture, or composition of matter or useful improvement thereof, upon which the United States Patent Office has issued a patent within twenty-five years."

While Mr. Schacht has secured patents in widely varying fields, his best-known invention is the electro coating of the abrasive grains on "sandpaper." By the use of a powerful electrostatic field, all the tiny crystals which formerly used to be dropped on the glued backing by gravity, falling as they would, are under the new method compelled to stand on end, push apart from their neighbors, and deposit themselves uniformly spaced with their longest axes at 90 degrees to the backing — in other words, sharpest ends to the work. This upending with uniform spacing gives faster cut, greater clearance, and much extended cutting life. Under varying conditions, the difference generally ranges from 20 to 50 per cent improved efficiency.

Mr. Schacht, a native of Sandusky and a graduate of the University of Michigan with the degree bachelor of science in civil engineering, has been with Behr-Manning since July, 1920, and in charge of manufacture since 1925.

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WATCH FOR AIR YOUTH ANNOUNCEMENTS

Association News

♦ The Department of Industrial Education of Kansas State Teachers College, Pittsburg, Kans., held its Fifth Annual Dinner at Hotel Besse, Pittsburg, on Saturday evening, February 17, 1940, at six o'clock. The purpose of the annual dinner is to receive reports from members of the staff who attend the two important industrial-education meetings of the year.

This year, two men attended the 30th meeting of the Manual Arts Conference of the Mississippi Valley, in Chicago, November 9 to 11, and five men attended the 33rd annual convention of the American Vocational Association, in Grand Rapids, Mich., December 6 to 9.

In addition to members of the Department faculty and their wives, graduate students, and members of the senior class, other guests at the dinner included President and Mrs. W. A. Brandenburg, Dean and Mrs. O. P. Dellinger, Professor and Mrs. G. W. Trout, Miss Lulu McPherson, and Harry O. McPherson.

Guests from out of the city were Mr. and Mrs. C. M. Miller, State Board for Vocational Education, Topeka; Mr. and Mrs. James C. Woodin, director industrial education, Wichita; Mr. and Mrs. Verne L. Pickens, supervisor industrial education, Kansas City, Mo.; Mr. Leon E. Falgren, director industrial education, Kansas City, Kans.; Mr. and Mrs. A. W. Blake, City Schools, Fort Smith, Ark.; Mr. and Mrs. Robert Runge, supervisor industrial arts, Springfield, Mo.; Dr. Hoyt H. London, University of Missouri, Columbia, Mo.

Dr. William T. Bawden, head of the department, served as Toastmaster, and supplemented the reports of the other speakers.

♦ The Illinois Vocational Association will hold its annual convention at the Morrison Hotel in Chicago on March 28, 29, and 30.

Prominent educators have accepted assignments on the programs of the general and sectional meetings that have been arranged. Tours to industrial plants and educational institutions have been planned, and there will be the usual well-arranged educational and commercial exhibits.

The Chicago schools will be open to visitors on Thursday and Friday, March 28 and 29.

There will also be the usual shop contests and all who attend will find themselves more than amply repaid for having attended this annual meeting of a very progressive group of industrial-arts and vocational-education teachers.

♦ The State Conference of Trade and Industrial Education, which will be attended by local supervisors, teacher trainers, and school administrators of trade and industrial education, will be held at the Morrison Hotel in Chicago, Thursday, March 28, 1940.

Forenoon session — 10:00 to 12:00 a.m. W. J. Colahan, Chairman, Superintendent of Schools, Woodstock.

1. *Teacher Training*, J. C. Shortall, teacher trainer, Board of Education, Chicago; Arthur F. Dodge, teacher trainer, University of Illinois, Urbana.

2. *Placement and Follow-up Work* after the completion of the course — Paul L. Roise, supervisor, Sterling Morton High School, Cicero.

Afternoon session — 1:00 to 5:00 p.m. Raymond D. Meade, Chairman, Principal, High School, Chicago Heights.

1. *Evening School* — organization of classes, selection of teachers, and preparation of the teaching material — Robert C. Keenen, principal, Carl Schurz Evening School, Chicago.

2. *Apprentice Training* — organization of courses, and preparation of the teaching material — Martin Brauns, Jr., supervisor, Part-time classes, Washburne Trade School, Chicago.

3. *All-day Courses* — selection of pupils and the preparation of the teaching material: Unit Trade, Dwight Ludden, supervisor, Granite City; General Industrial, G. L. Landis, teacher, Kewanee.

Banquet — 6:30 p.m. — Morrison Hotel.

♦ After an absence of 18 years the Western Arts Association returns to Cincinnati, Ohio, for its 46th annual convention, April 17 to 20, 1940. This pioneer organization for teachers of art, household arts, and industrial arts has always provided an interesting and stimulating program.

The Netherland Plaza Hotel will be headquarters for the general meetings and most of the sectional meetings. The industrial-arts sectional meetings and local displays will be held in the near-by Gibson Hotel.

The details of the industrial-arts program have not been announced, but the general plan will be about as follows:

Friday morning: Industrial-arts section meeting.

Friday afternoon: General Western Arts meeting, followed by "Artists at Work." Outstanding artists in wood carving, sculpturing, painting, potterymaking, weaving, and others will give practical demonstrations. This promises to be an event of unusual interest.

Friday evening: Western-arts banquet and dance.

Saturday morning: Industrial-arts section meeting.

Saturday noon: Industrial-arts rally luncheon. — *Elmer W. Christy.*

♦ The next annual meeting of the Indiana Industrial Education Association will be held in Richmond, April 5 and 6 at the new Richmond Senior High School.

The speakers will be John F. Friese, Pennsylvania State College, State College, Pa.; Lynn Emerson, of Cornell University; and the banquet speaker will be Captain A. A. Nichoson, manager, personnel department of The Texas Company.

On Friday afternoon there will be a general meeting for the benefit of superintendents, principals, and industrial-arts teachers. Dr. Emerson's address to this group will be, "Training of Industrial-Arts Teachers."

The chapter of Epsilon Pi Tau will feature a breakfast Saturday morning. — *H. G. McComb.*

♦ The first formal Mid-Western initiation and banquet program of Epsilon Pi Tau Fraternity

(Continued on page 24A)

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For Summer School Bulletin, address

DIRECTOR, SCHOOL OF TRADE AND INDUSTRIAL EDUCATION

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(Continued from page 23A)

will be held in Chicago, on March 30, 1940. This program will be held in the Roosevelt Room of the Morrison Hotel, and is being sponsored by the members of Epsilon Pi Tau in Michigan, Iowa, Wisconsin, Indiana, and Illinois. The chapters located in these states include Beta chapter, Ball State Teachers College, Muncie, Ind.; Zeta chapter, Northern Illinois State Teachers College, DeKalb, Ill.; Theta chapter, Stout Institute, Menomonie, Wis.; Iota chapter, Eastern Illinois State Teachers College, Charleston, Ill.; Mu chapter, State Teachers College, Terre Haute, Ind.; Pi chapter, State Teachers College, Cedar Falls, Iowa. The program follows the annual state meeting of the Illinois Vocational Association. This meeting will also be held in the Morrison Hotel, in Chicago, on March 29 and 30, 1940.

The initiation will be held at 3:30 p.m. and of course will be confined to members only. The banquet will also be held in the Roosevelt Room promptly at 6:00 p.m.

The speaker of the evening will be one of America's foremost exponents of industrial arts and industrial vocational education in our nation today — Dr. William H. Johnson, superintendent of schools in the city of Chicago.

♦ The National Graphic Arts Education Guild, an organization of 600 printing teachers in the United States and Canada, will meet at the Rochester Athenaeum and Mechanics Institute, Rochester, N. Y., June 30, July, 1, 2, and 3, 1940. A new plan of meeting will be held — that of symposia or clinical discussions. "Clinics" on the following subjects will be conducted: type composition, presswork, layout, and related work, all of which should prove to be a great help to printing teachers.

♦ The meeting of the executive board of the Central Connecticut Industrial Arts Association has voted to hold its spring meeting on May 17, 1940, at the C. A. Bingham School, Bristol, Conn.

One of the features of this meeting will be an exhibit of work done under student-teacher supervision, in grades 5 to 8 inclusive.

♦ The twentieth annual conference of the Southern West Virginia Industrial Arts Association will be held at New River State College, Montgomery, W. Va., on Saturday, April 27.— *Glen E. Best.*

♦ The Nebraska Industrial Arts Teachers Association will hold its meeting in Omaha on March 29 and 30 at the Hotel Fontenelle. The association is meeting jointly with the Department of Superintendents and Principals, and the Department of Elementary School Principals.

Dr. C. A. Prosser, of Dunwoody Institute, Minneapolis, Minn., will be the principal speaker.

♦ The fortieth convention of the International Acetylene Association will be held in Milwaukee, April 10, 11, and 12 at the Schroeder Hotel. Because of its importance as an industrial and scientific center, a record attendance of engineers, industrialist, and shop technicians is expected.

♦ The Industrial Education Club of the University of Maryland held a professional dinner meeting at the Emerson Hotel, Baltimore, Md., February 9, 1940. One hundred and twenty-five persons attended including State of Maryland education department officials, Baltimore City education officials, several county education representatives, personnel men from industry, and members of the club from all over the state.

Mr. Howard E. Zieffe, president of the club, gave greetings and presented the guests. He introduced Mr. John J. Seidel, Director of Vocational Education, who was representing Dr. Albert S. Cook, Superintendent of the State Department of Education. Mr. Seidel reminisced about the past twenty-five years.

Mr. Charles W. Sylvester, Director of Vocational Education for Baltimore City, introduced Dr. David E. Weglein, Superintendent of Public Instruction for Baltimore City, who spoke on, "A City School Superintendent Views Industrial Education."

Professor Glen D. Brown, University of Maryland, introduced Dr. Harold Benjamin, Dean of Education, University of Maryland, who spoke on, "The Place of Industrial Education in the Secondary School." Dr. Benjamin made some predictions for industrial education in the form of questions.

The theme of the meeting was, "Progressive Industrial Education: Industrial Arts and Vocational Education."— *Arthur A. Dick.*

♦ The semiannual Conference of Vocational Directors of Indiana was held February 15 and 16 at Anderson, Ind.

The two-day period was spent discussing the various types of work done in the schools throughout the state.

At the morning session on Thursday, H. F. Brickley of Muncie, had charge of the program. The subject for discussion was the organization and utilization of services of advisory committees.

W. B. Hill, Logansport, and E. T. Organ, Elkhart, had charge of the afternoon program. The topic for this meeting was, "Carrying on a Plant Training Program."

At the Friday morning session, Ray Adams of Terre Haute, and Bruce Bell of Chicago had charge of a forum in which the topic, "Preparing and Carrying on a Training Program for a Craft," was discussed. The Friday afternoon program was in charge of G. F. Weber, of South Bend. The subject of discussion was, "Carrying on a Training Program for Retail Stores."

♦ The Central Nebraska Industrial Arts Teachers met at Overton on Saturday, February 24. At the business meeting plans were made for the Industrial Arts Sectional Meeting at the District No. 4 State Teachers Association Convention which will be held in Kearney on October 31 and November 1.

The officers of the Central Nebraska Industrial Arts Teachers are, Kenneth Carlson, Wood River, President; and O. M. Freisen, North Platte, Secretary.— *W. E. Clark.*

(Continued on page 27A)

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(Continued from page 24A)

♦ The annual election banquet of the Mu Sigma Pi was held on Saturday, January 13. Fifty-five members attended. The results of the annual election were as follows: president, Edmond H. Stoelting; vice-president, Richard M. Carlsen; treasurer, S. Arthur Dunham; corresponding secretary, Chares H. Sechrest; recording secretary, Robert H. McCullough; executive board, James R. Hendrickson.

♦ The Michigan Industrial Education Society will hold its Thirteenth Annual Convention at the Book-Cadillac Hotel, Detroit, Mich., April 18 to 20, 1940.

This convention is always well attended, and the programs are of uniformly high quality.

The theme, "New Frontiers Within the Old" has been chosen for this year's deliberations in which speakers from the fields of labor, industry, and education will exchange viewpoints in order to solve such problems as employment possibilities for youth, problems of the job-seeking girl, training men and women for jobs in industry, apprentice training, safety in industrial education, promotion of industrial education, and the responsibilities of vocational directors.

Prominent among the speakers loom such names as Dr. R. O. Small, president of the American Vocational Association; Dr. Vierling Kersey, superintendent of schools, Los Angeles, Calif.; John Haren, Personnel Division, Chrysler Corp.; and many others.

There will, of course, be many sectional meetings, among them one on Adult Education.

Those who attend this convention need not bring along any knitting — there will be no idle moments.

News Notes

♦ Western State Teachers College of Kalamazoo, Mich., now offers a course in aviation mechanics, the first to be offered by any school of collegiate rank in Michigan, and one of the first of its kind in the United States. The course is offered in cooperation with the State Board of Control for Vocational Education. It is in charge of Elmer C. Weaver, of the faculty in the department of industrial arts.

The purpose of the course, according to President Paul Sangren, is to provide the aviation industry with the skill and leadership for foremen and department heads, and those engaged in semiprofessional activity in that industry.

The course will require a minimum of two years and will be open to high-school graduates who will be selected upon the basis of their aptitude in mechanics. Upon the successful completion of the course, the student will be prepared to meet the certification requirements of the Civil Aeronautics Authority.

Included in the subject matter presented in this curriculum will be aircraft overhauling and assembly, aircraft repair, aircraft instruments, aircraft welding, related, drafting, and machine-shop practices, related mathematics, air dynamics, and theory of flight.

♦ A gift of radio transmitting equipment, including a 1,000-watt transmitter, has been made by Columbia Broadcasting System to Ohio State University for use at its Radio Institute, Engineering School, and experimental station, WOSU. The equipment cost more than $25,000.

The gift was presented to J. Lewis Morrill, vice-president of the University, and Herbert S. Atkinson, trustee, by George Crandall, field representative of CBS.

♦ A large, abandoned factory building in Bristol, Conn., has now been completely renovated into a Technical High School department, and is attended by 190 boys. At present the subjects taught are, auto mechanics, woodworking, machine-shop work, tinsmithing, and electrical work. Plans are being made so that both high-school and unemployed boys can be taken into the courses three or four times throughout the year.

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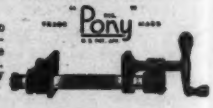

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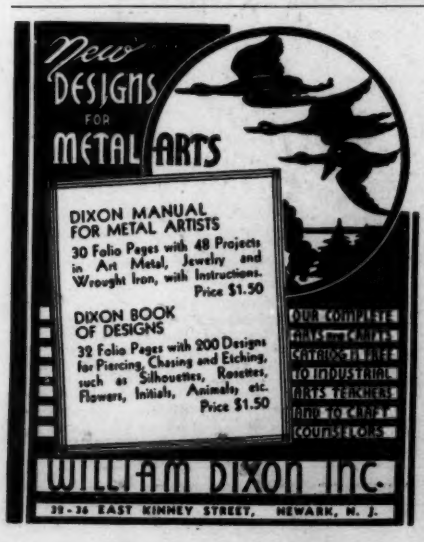
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